Issue 114 • 12 January 1991 • 70p

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NEW COMPUTER EXPRESS

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THIS WEEK

AMIGA
The £200 card that doubles your machine's power

ATARI
Panther mega-console set for Las Vegas launch

PC
IBM's 386 Notebook plans

ARCHIMEDES
The first RISCOS spreadsheet

CPC
Gazza II - the best game yet?

MAC PRICE WAR LOOMS

Why you will soon be able to buy a Mac at bargain basement prices...see page 7

CREATING A PUBLIC IMAGE

Face to face with the computers that can change the way you look

GAMERS

REGULAR TIPS & TRICKS FOR
MEGADRIVE
NINTENDO
ATARI LYNX
GX-4000
& 40 PAGES OF
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BARGAINS !!!

PLUS

PART ONE of the EXPRESS GUIDE to Making the Most of your Amiga & ST

WHY does this man DESTROY computers?

THE ONLY WAY IS UP!

THE CHEAPEST WAYS TO UPGRADE YOUR MACHINE

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frontend

edited by Colin Campbell

CAPTIVE CAPTURES GAMES AWARDS

Mindscape's enormous inter-planetary exploration game *Captive* has won the Best Game and Best Adventure awards for 1990.

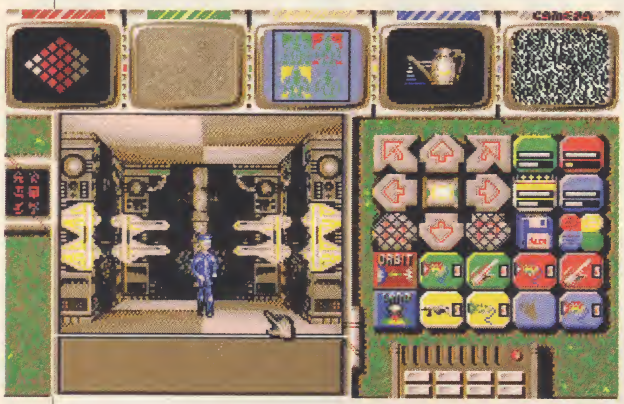
British computer gaming's major winners were announced at the annual 'industry dinner' held in London recently. Journalists and industry figures said that *Captive*'s depth of gameplay, intriguing plot and spooky action sequences had put it above competitors.

In yet another reminder of its success, Ocean was awarded the Best Software House award for the third year running, while Commodore's special gong for programming excellence on the Amiga went to Psygnosis for such popular games as *Shadow of the Beast II* and *The Killing Game Show*.

Speedball II (Mirrorsoft) picked up Best Arcade Game, *Lotus Esprit Turbo Challenge* (Gremlin) won the Best Licensed Property and MicroProse's *F19* was voted Best Simulation.

Another flight simulation, EA's *Interceptor*, won the Best of Budget award while *John Madden's Football* for the Megadrive picked up Best Video Game.

Other winners included Core Design for Best Developer and a special prize for technical merit went to Rainbird for its 3D fractal adventure *MidWInter*. ▪



Dell design faults hit the wrong key

PC manufacturer Dell has come up with the solution to a sticky problem.

Some users of Dell PCs had been complaining that the keys on their keyboards were not functioning properly. Dell investigated the matter and found that an "old design fault" meant that dust and fluff was collecting under keys and fouling up operations.

Dell sent out replacement keyboards to all those people who had been supplied with the dodgy models along with instructions on sending back the sticky keyboards.

A spokesman refused to say how many people had been affected but said it was not insubstantial. It seems that the unnamed supplier of the keyboards picked up the bill for replacements. ■

CD-ROM BREAKS THROUGH THE PRICE BARRIER

A sub-£400 CD-ROM drive has been launched by Philips, the company which invented the CD in the first place.

Philips says this is a "price breakthrough" and is stressing that buyers will be getting a complete system for £399. The CM50 plays both 12cm and 8cm CD-ROM and CD audio disks with a healthy storage capacity of up to 600Mb. Average access time is about 850 milliseconds and it can transfer data at 176 Kbytes per second.

The CM50 is being pitched as a "mass business audience" solution, and Philips is keen to point out that software for CD players is now widely available. Atari attempted to launch a cheap CD-ROM player two years ago, but lack of software support meant that the machine was doomed to be a failure.

CD-ROM disks can hold massive amounts of information and are becoming increasingly popular in information intensive professions such as the law, medicine, engineering and finance.

● This year's CD-ROM Europe show will be held at the Novotel in Hammersmith, London, from May 21st to 23rd, it was announced last week.

For further information contact organiser Agestream on 0733 60535. ▪

Betty Boo just doin' kung fu

Pop star Betty Boo is expected to hold a meeting this week with games programmers the Bitmap Brothers who are planning to launch a computer game based on the chart topping songstress.

Betty Boo, a keen computer games player, wants the Bitmaps to produce an action filled kung fu affair. The tie-up has come about through Rhythm King – Betty Boo's record company – and its links with the Bitmaps through 'rebel' software house Renegade.

Rhythm King spokeswoman Adele Nozedar commented: "She definitely wants to do a game because of her interest in computers. She's got a Nintendo, a Sega and an ST at home and I know she'll want to get involved. She's had a big say in every aspect of her career."

If all goes well the Boo game should be here this time next year. Previous attempts to launch pop-star based computer games include the highly successful Michael Jackson's *Moonwalker*, dodgy perverts' game *Sam Fox's Strip Poker* and the utterly dismal *Frankie Goes To Hollywood*. ■

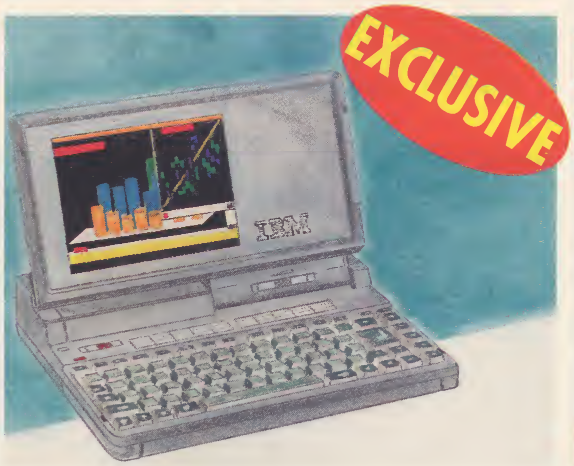
Ultimate number crunching

A dedicated arithmetic computer capable of previously unimaginable calculations has been completed.

The 'Little Fermat' machine (named after French mathematician Pierre de Fermat) can do nothing but calculate, but its arithmetic abilities are incredible. For instance, it can compute pi – the ratio between the diameter and the radius of a circle – to one thousand million decimal places. And it can multiply figures thousands of millions of digits long in a matter of seconds. It manages this by utilising mathematical theory first laid down by Pierre de Fermat in the 17th Century. One of Little Fermat's developer's David Chudnovsky, said: "I think Pierre would have been very proud if he could see what we have done with his numbers for which he could not see any practical use."

Little Fermat consists of a mass of 82,500 wires which the New York-based inventors describe as "a rat's nest of impenetrable machinery" and it will be used for weather predictions, aerodynamics and code breaking. ▪

IBM'S SECRET NOTEBOOK



IBM, in partnership with Toshiba, is planning to launch a lightweight but powerful notebook computer within the next few months.

The American and Japanese companies are involved in secret talks aimed at producing an IBM badged machine. We understand that the IBM notebook will be A4 sized and will weigh just over six pounds.

The first model will be a mono based 386SX with a 60Mb hard disk. Both firms are aiming at launching a colour version some time in 1992; at present a notebook with colour screen is not a practical option because of the weight of a backlight needed for colour LCD. Even so, Toshiba and IBM have been working together on flat-screen colour technology since 1989.

Both IBM and its Japanese friends are keen to develop a notebook market in the US and Europe. Such machines have already proved successful in Japan for the likes of Toshiba and Epson – more notebooks and portables are bought over there than desktop PCs.

Japanese companies have realised that the best way to break into this growing sector in America is to 'hold hands' with an established American name.

Sources suggest that the laptop will be launched here before the spring with a retail tag of about £3,500.

A spokesman for IBM told *Express*: "It is well known that we talk to various companies on all sorts of matters. I'm not saying whether or not we're talking to Toshiba about a notebook. If we are then it's confidential."

Meanwhile, IBM's great rival Apple is also working on a notebook. Apple watchers in California are predicting an August launch for the lightweight Macintosh based machine, with the exciting possibility of a hand-held Mac for 1992. ■

Archie's creative explosion

Creative Archimedes owners who aren't necessarily blessed with a degree in computer science are to be offered the chance to write their own games.

This week sees the launch of *Creator* from Portadown based Alpine Software. It's a fully RISC OS multi-tasking application which allows you to design a game without having to type in any listings. You'll simply be offered a multi-solution screen for every part of the game.

The Object Designer allows you to paste in your own sprite and then dictate how it acts. A Screen Designer means you can manage how a game looks and moves while the Path Designer gives you the chance to lay down how game characters move about.

Finally, the Event Manager dictates what actually happens in the game. – such as, how baddies die. It runs on the Archie and A3000, price has yet to be fixed but is expected to be about £35. Call 0762 342510. ■

• How would you cope in medieval England? Have you got what it takes to see off black knights? Can you get on well with wizards and kings?

If so then check out Virgin's forthcoming game Spirit of Excalibur. It's a dazzling 2.5Mb graphical adventure with action sequences to keep arcade fans happy. The PC version is out in March (£34.99) with ST and Amiga following in April (£29.99).

EC on-line

An on-line news service dedicated to the European Community has been launched by Reuters.

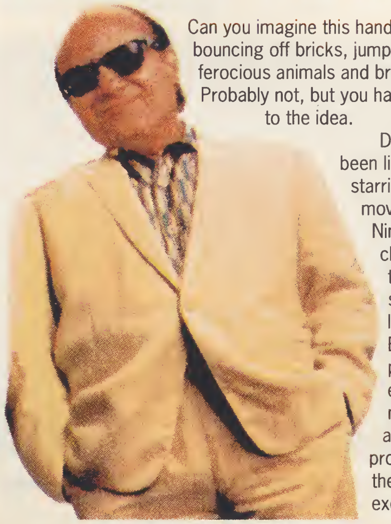
EC Report will cover community news as well as "anything that is relevant to the EC" and is being run through Reuters' Brussels office.

The on-line service runs on a normal IBM compatible PC and will include a word search facility for anyone who needs specifics.

In true community fashion it will be available in three languages – English, Italian and French.

The only drawback for Euro-fiends is the price – £400 a month. ■

MARIO AT THE MOVIES



Can you imagine this handsome fellow bouncing off bricks, jumping over nasty ferocious animals and breaking into castles? Probably not, but you had better get used to the idea.

Danny de Vito has been lined up for the starring role in the movie based on Nintendo games character Mario. In the US Mario, supposedly an Italian plumber from Brooklyn, is so popular that he has earned Nintendo more money than any movie ever produced, with the excusable exception of *ET*. ■

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DEATH OF A

Express visited Britain's biggest 'computer recycling plant' and saw how machines end their days...

Report by Colin Campbell

Things fall apart, everything comes to an end, and computers aren't an exception to the rule.

Even the most colossal, enduring and advanced machine must one day falter, stop and cease to be.

That day comes very suddenly and very violently for the mainframes, minis and personal computers which pass through the gates of Mr Anthony Else's "computer recycling" plant in dreary Biggleswade. Else employs a small gang of tool-wielding men whose working day is spent ripping the guts out of the sort of hardware we can only dream about.

The silenced circuitry and fractured boards are cast into giant buckets from whence they are taken to be melted down. The value is in those little specks of gold and silver which the manufacturers intended as efficient conductors. Precious metals are the prize for Britain's top computer recycler, but there are also sizeable quantities of copper and aluminium for the hovering scrap merchants.

> "I get a kick out of scrapping computers... it doesn't take long to show who is the boss."

Even the empty metallic carcusses, which were the computer casing, are carted off for an ignominious end in the scrap yard.

Judging by this evidence you might be forgiven for believing Else to be a philistine and a butcher. This is most definitely not the truth. For while he probably isn't a paid up member of the Computer Preservation Society, he does see more than gold in them thar computers.

Else has found that while ripping redundant computers apart for components is a lucrative business, there are also plentiful profits in re-jigging hardware and selling it back into the mainstream.

Disk drives, printers, monitors, hard drives and whole computer systems, rejected by their hastily upgrading owners, are sussed out for their likely value in pure scrap terms. But if a machine's value as a useful piece of kit outweighs the advantages of killing it off, it is spared the horrors of the angle grinder, cutter and screwdriver.

Buyers from Eastern Europe are more than happy to get their hands on computers which Western corporations no longer find viable. We've all heard of the follies and sins of computerised companies and their eagerness to dispose of so-called outdated equipment. This is fertile ground indeed.

He knows much more about computers than the market price for gold, but is infuriatingly reluctant to give away any secrets. Throughout our speedy tour of the operation he restricted his market knowledge to such flimsy quotes as "we work hard here". There's no question of spilling the beans on laughable deals conjured up by naive companies, or of revealing the value of any equipment. He wouldn't allow his photograph to be taken and expressed concern that he'd be portrayed as "a modern day Steptoe".

• In Else's warehouse millions of pounds worth of computers await their fate. Some will be sold back to bargain hunters.

Else uses two buildings in Biggleswade. One is a veritable Aladdin's Cave chock-a-block with all manner of delicious pieces of hardware. Vats full of keyboards and printers, pallette's stacked with monitors, giant laser printers and mainframe computers. There are PCs lined up in silent expectation, some of them appear to be new.

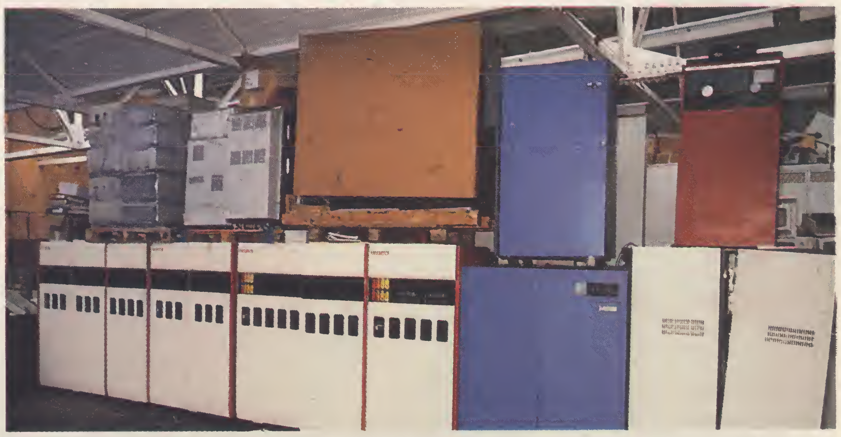
So where does it all come from? Else won't be specific, but claims that anyone in the know, who feels the need to offload some kit, will be on the buzzer to Biggleswade sooner or later. He will take out complete networks from large corporations, governmental institutions, (including the Ministry of Defence) banks, hospitals, anywhere. Hardware manufacturers who want to discreetly lose some stock will invite Else to destroy the equipment beyond recognition. They are concerned that unwelcome third party maintenance companies will lay their hands on such rich pickings.

He's one of those fortunate few who can justifiably claim to keep everyone happy. A middle man who can just as easily furnish you with low cost computing solutions as he can destroy a large computer network.

It's in the second factory – the knackers yard – that computers end their days. Along one wall sits a collection of mainframes which probably date back about 15 years.

The labour force of half a dozen toil opposite the wretched computers. Else's boys are more than capable of turning expensive streamlined computers into

• It takes little more than half an hour for this computer to be completely taken apart, and for all the valuable bits to be separated.



• Some mainframes are up to 15 years old. Their computing power is comparatively weak, but they are full of fine components. They don't make 'em like they used to.

A COMPUTER

Some will be ripped apart for their scrap value.

ugly piles of coil and plastic.

A machine will be dumped at the front of a destruction line. Here the most technically able man will see to it that the tasty bits and bobs are reprieved. They will be sold off to maintenance companies or brokers of second hand equipment. Else bounces around the factory floor ensuring that no goodies are destroyed.

The other men need little technical expertise. They are paid to destroy quickly and efficiently with whatever tools are available. Else told us, with some self-satisfaction: "We recycle everything in the machines. Everything except the plastic. There's nothing we can do about that, but we have tried."

Bins are dotted around containing any monitors or hard drives which someone could use. Or there are the massive buckets full of circuit boards which will be melted down for the gold.

The workmen impassively go about their business, but some computers put up a fierce fight and it often takes more than a good screwdriver to carry out the execution.

Eamonn McNicholl is there to deliver the final blow. What he receives hardly resembles a computer – just the last niggly bits which need to be separated.

"It's a great job because breaking things is a lot more fun than putting things together," McNicholl commented, "I get a kick out of scrapping computers. People go on about how they're taking over our lives, but it doesn't take long to show who is the boss." ■

• Vats are filled with circuit boards, all of which sparkle with tiny dots of gold or silver. This lot is worth money.

• The men work on what might be called a de-production line. But taking a computer apart is not as easy as it sounds.

• Palettes of printers. Imagine what one of these costs new.

• The technical manager knows all there is to know about the inside of a computer. He makes sure no goodies go astray.

• Keyboards galore: second-hand dealers will buy job lots of add-ons and peripherals.

Census on crime danger

Due to fears of hacking, the mainframe at the centre of this year's £135 million UK census has been armed with defence systems.

The British Computer Society which recently carried out a study into the massive data gathering operation made it clear that hacking presented a real threat. The BCS report on security, and the Government's response are to be published in a White Paper this March. The report highlights computer crime as a major danger and one which was not in effect during the last census in 1981.

The body in charge of the census – the Office of Population Censuses and Surveys based in Hampshire – is readying itself to collate the 23 million forms to be be sent out on April 21st. OPCS claims that new computer technology will cut at least a year off previous processing time. By the time the next census rolls around in 2001 the OPCS plans to have all details dating back to 1961 in digital form. ■

Exorcise those burning ghosts

A Hertfordshire company has released a handy piece of software which solves a problem you probably don't even know you have.

Blanket from WSA, helps minimise damaging burn-in, a technical term for the ghostly images which remain on your computer screen after it has been switched off. It is caused by leaving the same image onscreen for long periods, such as a menu or spreadsheet.

Blanket watches the key board and blanks the screen when the keys are not being used. The display returns as soon as a key is touched. WSA claims this lengthens the life of monitors by switching off the electron beam which causes phosphor burn-in.

The software is easy to install and takes up less than 1K of memory. It works on most monitors and costs £95. For more information call 0992 553341. ■

Soviet prices up

Times are hard in all aspects of Soviet life and computing is no exception – the Soviet government has been forced to raise computer prices.

Recent reports from Russia have stated that an AT compatible will now cost you 55,000 roubles, 9,000 roubles up on December 1990 prices. This equates to a horrific £48,000 in real terms, a good £47,000 up on Western European prices. ■

PC virus 'blackmailer' faces charges in UK

AIDS SCANDAL MAN FACES EXTRADITION

An man from Ohio, USA, faces extradition to the UK on computer blackmail charges. These arise from the 'AIDS Information Introductory Diskette' trojan horse virus which shocked the computing world in 1989 (*Express* 59). Lawyers for the man claim that his alleged actions were to raise funds for AIDS research.

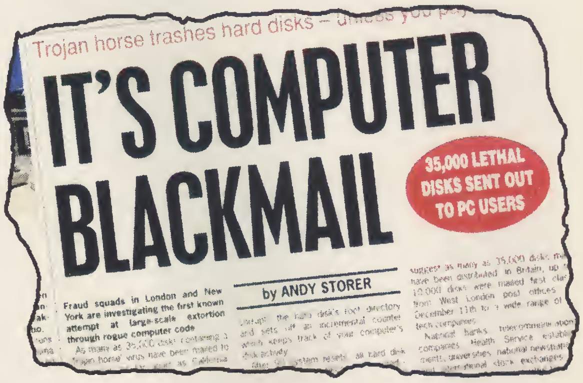
Joseph Popp Jr is said to have sent 35,000 PC disks to businesses, hospitals, and government agencies under the pretence that information contained therein would assess the user's chances of suffering from AIDS. The trojan horse virus which was actually on the disk, wiped hard drives after 90 system resets. It is alleged that Popp was demanding $378 from unlucky users before providing them with a 'key' to disable the virus.

Defence lawyers for Popp, holder of a Harvard Phd, maintain that the $13,230,000 which could have been received as a result was to go towards AIDS research. They also point out that each disk label contained a message warning that use of the software could damage computers.

The American judge handling the extradiction hearing threw out this argument, saying that the warning was in such small print that hapless users would have booted the disk before reading it.

Popp, who has been under house arrest on $50,000 bail since February 1990, found his position further weakened by a statement from J Matthew Cain, head of a Ohio's Criminal Investigation Office. Cain commented: "AIDS information provided by Popp was quite superficial". He also said that there was no evidence to lead anyone to believe that Popp's motivation was in anyway charitable.

Several other European governments, including Spain and Germany are also looking to extradite Popp. ■



Trojan horse trashes hard disks –

IT'S COMPUTER BLACKMAIL

35,000 LETHAL DISKS SENT OUT TO PC USERS

by ANDY STORER

Fraud squads in London and New York are investigating the first known attempt at large-scale extortion through rogue computer code

• *Flashback: AIDS scandal shocked PC users.*

• *Archie: still favourite in schools.*

Acorn 'top of the class'

Acorn continues to dominate the educational side of the computer market, according to independent market research (MaS, Nov 1990).

Figures show that 53 per cent of all computers shipped to schools in the first eight months of 1990 were Acorn systems. The new BBC A3000 is also revealed as the largest selling computer to schools in the same period.

In primary schools Acorn took a massive two thirds of the market. It shipped 40 per cent of all computers sold to secondary schools, remaining the largest supplier in this area too.

While the company is still eighth in the manufacturer's overall league table for the UK, Acorn is enthusiastic about its future growth.

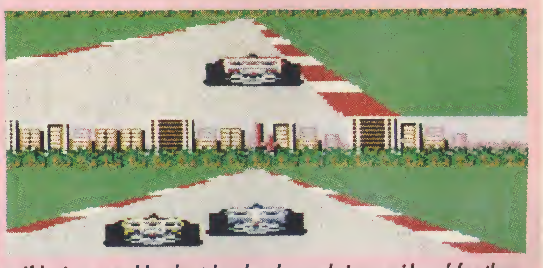
"Now we have received confirmation that we are actually growing our market share and reinforcing our position as the number one supplier of computers to UK schools, 1991 is going to be even better," says Chris Humphries, Acorn's educational sales and marketing manager.

Acorn will no doubt be making the most of this news during its appearance at the 1991 BETT Exhibition at the Barbican Centre from January 16 to 19. There will also be a special presentation during the show to mark the sale of the 100,000th Archimedes computer. ■

Printer package deal

Epson is packaging its PC AX and AX3 series of portables with a free modem and Datatalk communications software for release at bargain prices.

The 80286-based PC AX portable bundle, which will come with an Epson triple standard modem and the Datatalk software, will retail at £1,699 for a 20Mb machine and £1,999 for the 40Mb version. The 80386-based PC AX3 is now available with an Epson quad-speed modem as well as Datatalk. The 40Mb bundle will set you back £2,999, while you will have to pay another £300 for the 80Mb version. ■



• *If haring around bends at breakneck speeds is your idea of fun then this could be the game for you*

The race is on

Super Monaco Grand Prix, which up until now has only been available in arcades and on the Megadrive is to be released for home computers in March of this year.

US Gold has won the licence which will see owners of 8 and 16-bit computers racing around simulations of all 16 Formula One circuits. Not only are all the world championship tracks available in the right order, you also get to choose your rival. According to US Gold, the game includes "true to life car controls' and makes use of both qualifying and race circuits. *Super Monaco GP* will be available for the Amiga, ST, Spectrum, C64, and CPC. ■

Panther springs out

Atari will be launching its high-end games console, known as the Panther, later this month.

The machine will be unveiled "in all its glory" at the Consumer Electronics Show in Las Vegas in two weeks time. One insider said that the Panther is "a super-duper games console which is not ST compatible". A September launch for the UK is already being planned

Meanwhile, Atari in the US is expected to announce drastic price cuts for its handheld Lynx console. The UK price will stay at £120 for now, but it could drop to below £100 for the peak autumn buying season.

Check out all the news from CES in *Express* in two weeks. ■

Intelligent homes chip

A powerful new chip the size of a beetle is set to make 'intelligent buildings' a reality within a few years.

The "neuron chip", designed by Californian company Echelon, offers the processing power of three miniature computers for a proposed cost of less than one pound. Echelon, founded by industry guru Mike Markkula who was also a co-founder of Apple, believes that the chip is the breakthrough for which architects and designers have been waiting in order to build 'thinking' houses and factories.

The chip will allow for what the company terms "peer to peer protocol." This means that various electronic devices built by different manufacturers will be able to interact freely. A building could contain thousands of these chips in all sorts of appliances from the central heating systems and burglar alarms to your television set and your alarm clock.

In the event of a fire a system could be set up whereby the sensors detecting the light and heat will set off a chain reaction switching on sprinklers and sound alarms, as well as 'phoning up the firebrigade and lighting up signs indicating the safest and quickest route out.

More indulgent uses for the chips could include an alarm clock system which only wakes you up when sensors detect it is a warm day or a central heating system which shuts down when there is no-one in the building.

The chips could also be installed in car headlamps, drastically simplifying the complicated wiring systems.

Toshiba and Motorola will be manufacturing the chips, and major international companies including AT&T and Sony are looking into applications. ■

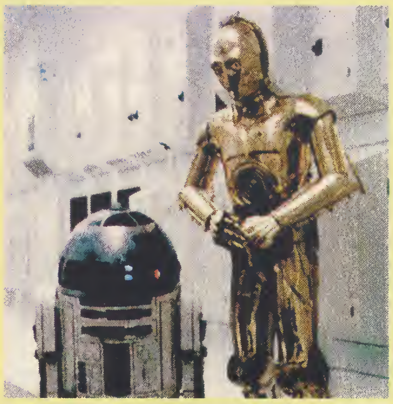
Star Wars strikes back

A totally new *Star Wars* game for the Nintendo Famicon already looks set to be one of the major software releases of 1991.

Lucas Arts Entertainment, which will be producing the game, has signed a marketing deal with JVC. The first version of the game should be released in April in the US for $50 and two months later in Europe and Japan. A Super-Famicom version will be available in 1992. There are also plans for a PC version.

The new game will be a mixture of role playing and shoot-'em-up action involving a whole host of favourites from the *Star Wars* trilogy. The original *Star Wars* game was a massive success, and this is partly because the film itself is designed like a computer game, with a fast-paced series of action set pieces.

So confident are the companies involved that the new *Star Wars* game is going to be a blockbuster they are throwing a massive launch party at the Las Vegas CES later this month. ■



• Star Wars: *a new game for a great film*

Software service

Freeway Software has announced the upgrade to its popular *Accounts Plus* package. *LedgerMaster* is a shareware suit of business programs for the PC.

The software offers full colour, menu driven trading and service invoicing as well as nominal ledgers. These ledgers will accommodate sole traders, partnerships, or limited companies. Profit and loss reports can also be generated, as can invoices and full reports.

Price is £15, which adheres to Freeway's shareware philosophy. If you want a user manual and registration, it will cost you £45.

Call 0257 472006. ■

Apple moves towards better deal for customers

MAC BUYERS TO GET BARGAINS

Buyers of Apple's recently launched Macintosh Classic could be offered massive savings when the company opens up its doors to independent retailers this year.

Trade sources suggest that Apple will prise open its tight distribution network within the next few months in an effort to introduce the low-cost Classic to small business and home buyers. And Apple has confirmed that it is looking at "new ways" of selling the entry level machine.

At present, buying a Macintosh usually means going to AppleCentres – business orientated stores which offer professional help without offering the sort of price options normally seen on the High Street.

However, Apple is at last recognising that the average computer buyer wants the chance to buy cheap machines off the shelf.

This could mean savings of up to £150 on the entry level Classic, and incredible savings of up to £350 on the 20Mb hard disk version.

The new plans involve a three-tier distribution system based on that utilised by other computer manufacturers in the UK.

• *Mac Classic: bargain opportunities.*

- The best prices will come from independent dealers and mail order outfits. They will be able to offer various configurations including cheap third party hard disks. A Mac Classic with 20Mb hard disk should cost just under £1,000. But canny dealers could conceivably put a machine out at less than £700.

And with the base Classic carrying a 25 per cent mark-up, box shifters could offer that at under £500.

- Talks have been underway with a number of well known High Street retailers which are interested in broadening their range of computers. These are understood to include Dixons, Comet and Tandy; unfortunately none of these retail chains are prepared to comment on forthcoming stocking plans.

Apple watchers feel that Tandy will be the favoured option because of the firm's close contacts with its parent company in the US. Tandy's level of in-store technical expertise has also impressed hardware manufacturers.

Any High Street retailer will be at liberty to cut prices in order to bring customers into its shops. Tandy already has an excellent reputation among buyers for juicy bargains.

- Apple itself is reported to be planning a retail chain of its own, known as 'AppleShops'. According to trade mag *MicroScope*, heavier than expected demand for the Classic has prompted the company to consider investing in a kind of AppleCentre for home and small business computer buyers. Here, prices are not likely to be especially attractive although service will be good.

Apple has the financial muscle to move into the High Street, and believes such a plan would not harm the business of the older AppleCentres which would still be catering for heavyweight corporate and professional buyers.

AppleCentres are not enormously keen on the Classic because the profit margins are much lower than those of more expensive machines.

However, they are understandably worried about the possibility of losing their exclusive position.

Apple spokeswoman Judith Coley commented: "We are looking at new ways and opportunities for selling the Macintosh partcularly the new low cost systems, but we have no plans for an immediate statement. There is no D-Day involved."

Meanwhile, hopes are rising that budgetised versions of top Macintosh applications software will be launched by software publishers in an attempt to woo first time Mac buyers. Apple is understood to be encouraging software partners to bring prices down in any way they can to expand the market. ■

CHESS KINGS

• Chess Champion 2175X *takes on the eventual winner, the seemingly unbeatable Mephisto.*

Rick Jackson reports on the Microcomputer World Chess Championship in Lyon.

As Karpov and Kasparov battled it out in the Palais de Congres, just down the road the World Microcomputer Chess operators puzzled over the latest moves from their programs. The tournament was seven rounds over six days followed by an all-play-all 10 minute Blitz tournament on the last day.

There was a slightly disappointing turnout from the commercial manufacturers to take on the might of Mephisto, winner for the last six years running. Only three commercial software programs dared to run against the dedicated computer from Munich with its 50MHz 68030 chip, at least four times faster than any of its competitors.

Mephisto won again, with the Personal Computer Blitz Chess title claimed by *Chess Champion 2175X* and the Personal Computer Amateur Chess title going to *Echecs* 1.9. Richard Lang, the Mephisto programmer, pronounced himself very happy with his 'Lyon' program, undefeated over six days and two competitions. Will there ever be a challenger who can beat him?

The only other Briton involved was Chris Whittington of Oxford Softworks, delighted with the performance of his *2175X* program in the 10 minute blitz tournament. "That's not bad for a £29.95 commercial program against a dedicated computer costing over £5,000." he said. "And we played the first six days with a bug that caused our 2Mb opening book to select the worst rather than the best moves. When that was sorted out we did brilliantly."

"Computer chess, now played at master level, really bears no resemblance to the programs of even five years ago," he added. "Programs are improving at around 70-100 ELO points each year, which means that in 10 years time we might expect to compete at top Grandmaster level. During the Kasparov-Karpov games some of the computers were correctly predicting the Grandmaster's moves and on two occasions were able to predict wins which the two world title contenders had missed."

How is this being achieved? The big debate in computer chess seems to be about decision making. Some programs use what is called 'brute-force' to search every branch of the tree for each move and some are 'selective'. They ignore duplicated positions on different branches and they score each position to ignore inactive lines of play.

Most of the authors said they were moving towards selectivity, or at least a combination of both tactics. Mephisto's Richard Lang certainly sees that as the future and he attributes his continuing success to much greater chess knowledge, not to mention the power of his computer.

Chris Whittington is researching into getting his program to play in the style of particular masters. "We'd like to give users the option to select to play against the style of Tal, Bobby Fischer or Kasparov," he said.

Some of the other challengers put up creditable performances too. They were mostly amateurs from Germany, Holland and France plus a Dutch company represented by *Gideon* and *The King*, both using a $500 ARM2 RISC card plugged into a PC.

Ed Schroeder of Gideon and Johan de Konig of *The King* both see the future in terms of innovative hardware, the RISC (Reduced Instruction Set Computer) for which each instruction is executed much faster. "It still made some silly moves", confessed a reasonably happy Gideon operator. De Konig thought his chess expertise let him down in the opening book and the endgame, but both these players will continue and their products will be commercially available. Both are looking to the selectivity option for the future.

> **" We'd like to give users the option to select to play against the style of Tal, Bobby Fischer or Kasparov "**

So, what else is on offer besides secret selection procedures, more detailed opening books and improved end-game play? Werner Koch, author of the *Patzer* program spoke about his transposition table which limits the duplication of searches down different branches of the tree. Reinhold Gellner of *Nightmare* calls his secret Quiescence Search, he is committed to brute-force searching but with deeper searching of active positions. Frenchman J.C.Weill is introducing a method of tactical evaluation called the 'swap-off' algorithm for his *Cumulus* program, but a bug in this caused his program to give pieces away on more than one occasion. Dutchman Fred Felkers is looking to escape from the speed limitations of Pascal since all his competitors use either C or assembler or a combination of the two. "*Delta* is free to anyone who wants it though", he said. Each author has his own secret formula, his own private terminology and presumably quite a mania to go on computing.

Forget 80286 PCs if you want to join the fray. Only one competitor was on that standard and he came last. Speed is crucial to these endless searches whether brute or selective or cranky. Most competitors were using Intel 80386, 80486, RISC or Motorola 68030 processors.

Opinion is divided as to whether amateurs can successfully compete with the established programmers. Some take the view that the mass of chess knowledge encapsulated in the leading programs is simply too great. Others say that with a modified version of one of the various public domain C language chess programs, some added chess knowledge and a very fast computer anything is possible. One of the English companies involved in the field is looking to sponsor chess program development by talented newcomers.

Back to Chris Whittington, who has been at it for more than a decade: "It's speed, yes, and whatever method of selectivity you can develop, but I am increasingly interested in accurate chess knowledge." His *Chess 2175X* has an opening book 20 times the size of the competitors. "That is like giving the program playing experience," he says. "Get it off to a good start with no careless moves and you have the chance to take on anything. In a way things are coming full circle, through the heat of programming technology and hardware developments and back to pure chess again. Seriously, in 10 years we will challenge Kasparov," he said. ■

• Check-Check *(left) takes on* Nightmare *at the Lyon championship.*

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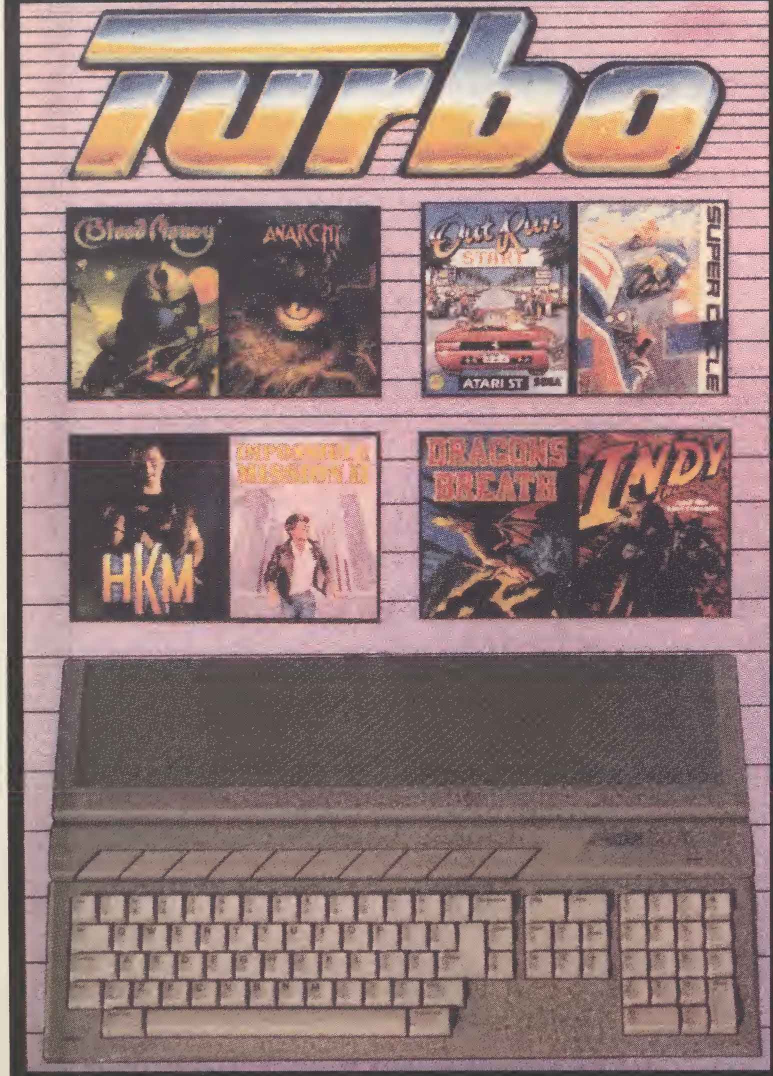

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THE WEEK IN VIEW

William Pascoe, boss of New York computer importer Wise Designs, claims the Big Apple's buyers are junking desktop PCs forever...

Nobody but nobody talks about PCs these days unless they're talking completely portable. I specialise in importing the newest in Japanese computer equipment and selling it on to what you might call City Slickers.

These are people who can't get by without the fanciest in Far Eastern gadgetry – already they're getting bored of colour 386SX portables, the kind of thing Epson and Toshiba are good at.

I don't wish to sound patronising, but if you want to see what tomorrow's computer market will look like, take a wander around Manhatten. We're not too far behind Tokyo.

People here are becoming animated about powerful notebook PCs, and rumours of collaboration between Toshiba and IBM are generating considerable excitement among the 'small really is beautiful' proponents. Apple is also believed to be up to something in the way of notebooks.

I think the problem in the past has been that notebook PCs and handheld computers have come across as being unnecessarily self-important without any justification. Sure, they can get you up in the morning and tell you where your favourite restaurant is, but they're not really computers.

Even the people who make them are now admitting that they've been selling fancy calculators rather than computers.

But the Japanese have an uncanny habit of picking up where other people have left off. They like small things and they've managed to persuade the rest of us that, at least when it comes to consumer electronics, they are absolutely right. Don't forget that in Japan the portable market is now bigger than the desktop market. Here, and in Europe, things are moving that way too.

Within two years, maybe less, users will be desperate to offload their desktops unless they're absolutely crucial to operations. Why? Because they're so big and fat and ugly. Portables are smarter in every way including display.

Notebook PCs from the likes of Apple, Toshiba, IBM and Epson will be worth having because they will be light and powerful with a good display. There will also be lovely touches such as models which are controlled by the user writing in long hand onto a screen.

Can you see any advantage in using a machine which makes a lot of noise and takes up a lot of space when you can use a sleeker, lighter version of the same computer? I've given up bringing desktops into the country because they're just not interesting enough. I'm afraid it's the end of the line for desktops, and the beginning of great times for portables and notebooks. ■

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■ Dangerously real?

I am writing to air my views on what I fear is already becoming a dangerous obsession among many in the computer world – Virtual Reality. Like many others, I was initially astounded by the possibilities of this exciting new development in the world of computer entertainment. But recently I have become more and more worried about the prospect of technology and software developing so fast that we are faced with systems with capabilities such that you can't tell the difference between the virtual world and the real world.

Maybe I'm being pessimistic, but imagine a world where people spent most of their time living some electronic fantasy rather than being 'real people'; children being born into a society where the development of normal human relationships has been replaced by a compulsive need to experience virtual reality at any cost.

Another worrying side of this is the possibility for a corrupt government to infiltrate the VR development system and somehow alter it for its own purposes; Orwell's predictions in his book *1984* may prove to have been correct, if a decade or so early.

So what is to be done? Don't get me wrong, I'm not some raving technophobe who wants to destroy all computers and go back to living in caves; far from it. However I think that someone, somewhere, will have to sit down and have a long think about where these developments are leading us, and how far it will go before it is halted, either directly be someone passing a law against it (an infringement of your Civil Right to explore Xentos IV while sitting in your living room? – probably) or by things going to such an extreme that we forget that we have to eat or sleep, and mankind lapses into a state of electronic suspended animation ?

I know this probably sounds like scaremongering, but I hope it'll provoke some thought about this subject amongst the powers that be.

Glenn Proctor, Portadown, Northern Ireland

It is only virtual reality, Glenn and is a long way away from being a really convincing simulation of the real world. Maybe you are reading a bit too much into the possibilities – although I can see your point, perhaps you are being a tad paranoid? Let's see what other folks have to contribute to this new debate...

H F-W

■ Poor language

This is the first time I have written a letter of complaint to a magazine – I can tolerate most things, but I must comment on the issue of *New Computer Express* which I bought before Christmas.

In the guide to buying a computer you classified prospective buyers as 'Low budget' or 'Rich bastard'. Why the latter term? What reason was there for deliberately using an obscenity to describe someone who might be able to afford one of the more expensive computers?

Was it a deliberate attempt to offend such people? Was it because the writer of the article lacked the imagination to think of a more appropriate polite term?

As a teacher, I spend a lot of my time, not trying to impose some notion of a proper way to speak to children, but trying to make them aware of the power of language and the need to be sensitive to its use. I spend quite a lot of time dealing with children who use obscene language quite casually and without any regard to its nature or effect.

There are perhaps times when swearing and obscenity are justified, but surely we must be aware of what we are doing? Was your journalist in this case? Surely journalists, more than many others, should be sensitive to the role of language?

I am sure you are aware that your magazine is read by many young people, and whilst I am not going to suggest that every one of them is going to start swearing as a result of your article, the way you present yourself contributes, albeit subconsciously, to their attitudes and responses.

Teachers have been blamed recently for low standards of literacy in our young people, and we certainly face difficulties in many areas. We are not helped, however, by the sort of slack, unthinking, language I am complaining about here. Can you assure me that it is not company policy to use swear words in articles? Could you perhaps ask your writers to be a little more sensitive?

Alan Gilholm, Bedlington

What a lot of questions! To start off with, let me say that we don't really have a company policy about the use of swear words – except, perhaps, that if they are to be used then they should be used in context and with a purpose. You may have spotted swear words in these very letters pages Alan, but I think you would have to agree that I have never used them gratuitously – or allowed correspondents to get away with using them gratuitously in their letters.

And to be pernickety, I would hardly rank 'bastard' as a swear word. Indeed, I would argue that its common usage these days is as a term of mild derision or gentle abuse, and it has a place in everyday vocabulary. Thirty or more years ago, words such as 'bastard', 'bugger' and even 'blimey' (a concatenation of the blasphemous phrase 'God blind me') were regarded as swear words and rarely cropped up in 'polite' company. But times change, and language evolves.

Sure, our writer could have used a term like 'Money no object' or 'Limitless budget' as an alternative to the phrase 'Rich bastard' – and maybe he should have done. But then again, he was writing in the language that would be familiar to the majority of our readers and was probably attempting to introduce a twist of humour into what could otherwise have been a pedantically literal phrase.

'Rich bastard' obscene? I think not. Point taken, though, Alan. I wonder if anyone else would like to chip in on the subject of rude words?

H F-W

■ OS Wars...

In reply to Gary Thomlinson's letter (*Express* 113) regarding operating system programming, I feel I should point out his argument between the ST and the Amiga is, with all due respect, a load of hogwash; and bringing the poor Archie into the fray is beyond belief!

Let's look at it again: the Amiga and ST are based on the 68000 – the Archie is based on Acorn's ARM (RISC chip) so the three machines are hardly comparable to start with! Since I don't program Acorn's machine, I can't really comment further – the ST and the Amiga (which I do program in assembler) are a different story, though.

The ST is a single-tasked machine with a rudimentary multi-program environment (desk accessories). The Amiga's operating system is fully multi-tasking, giving rise to some devilish complexities by its very nature. (Try asking a Unix\or Windows 386 programmer what he or she thinks about it!) As regards the two systems mentioned: GEM is ugly, simplistic, adopted from the PC and is suffering a decline in its native world; Intuition, on the other hand, was designed solely for the Amiga.

Under GEM, jobs like refreshing windows have to be managed by the programmer – you get sent a list of redraw rectangles, assuming the other programs bother to send them correctly. Intuition can do this, but can also look after refresh for you – which is much simpler. Frankly, once you get used to Intuition, GEM is a real dog. Admittedly, the Amiga does slow down when you are running several clocks at once – but that's because it's drawing complex graphics. The ST could not run several clocks at once without specially designed software.

The final nail in the ST's coffin has been marked by recent (and widely reported) bugs in later versions of TOS. I'm not about to suggest the Amiga is perfect – far from it – but by virtue of its design, serious bugs can be quickly and easily rectified. Also, the addition of external function libraries, device handlers and so on, allows the Amiga system virtually unlimited expansion.

Sorry Gary, in my opinion your argument holds water like a colander. Why not look again when you have a bit more experience of the two systems?

Mark Smiddy, The Designer Mouseware Team, Redcar

Thanks for that, Mark. I wonder if your missive will spark off a flood of anti-Intuition letters?

H F-W

■ New Debate

I have come up with a newdebate: My Computer Games Are Older Than Your Computer Games.

What do I mean? Well, I am writing this to prove that graphics are not the main feature in computer games – it's the playability that counts.

I have recently been playing (on the Spectrum) *Skool Daze, Back To Skool,* *Micronaut One, Hardball* and *Gilligan's Gold.*

I have had all these games since they were first released, and even after all this time, I am still playing them. It's playability that counts, not graphics or sound.

Yes, it is an extra to have nice graphics, but never turn down a game that doesn't have them. The only exception to that rule is if the graphics and sound are an essential part of the game – *Trivial Pursuit* springs to mind...

Ashley Price, Lewes, Sussex

Quite right Ashley. Window dressing can easily be confused with quality.

H F-W

ONE OF HAYDN'S £5 WINNERS

■ Interesting Twist...

Five 'MCIBTYC' topics for the Amiga...

1) My Computer Has More Viruses Than Your Computer

2) My Computer's Power Supply Is More Unreliable Than Your Computer's

3) My Computer Has More Unreadable Demo Scrolls Than Your Computer

4) My Disk Drive Is Slower Than Your Disk Drive

5) My Computer Has More 'My Computer Is Better Than Your Computer' Correspondents Than Your Computer

...and five for the ST...

1) My Computer Has More Incompatibility Problems Than Your Computer (one for STE owners only)

2) My Computer Has More Bigoted Columnists Than Your Computer (did I mention Steve Carey?)

3) My Computer Is Used By More Crap House Musicians Than Your Computer

4) My Computer Company Has More Opinionated Bosses Than Your Computer Company

5) My Computer Is Attacked By More 'My Computer Is Better Than Your Computer' Correspondents Than Your Computer

Yours

Richard Fairhurst, Oakham, Rutland

Well. The least I can do is send one of my famous fivers winging its way to you, Richard. Keep your lists coming, folks!

H F-W

■ Horses for courses

All computers are different – and some computers will be more apt for certain uses than others. Which is why no one computer is better than any other. For example, my 16-bit computer is excellent for stuff like wordprocessing, graphics and manipulation of huge amounts of data. But I also have an 8-bit computer which I think has more enjoyable games – especially arcade games – and which is more enjoyable to program high-level languages on.

The problem concerning games is that a lot of software houses treat all computers as equal. Of course 16-bit machines have better graphics and sound, but software houses produce the same games on all computers – they don't design a certain game for a certain machine. There are some exceptions, like Cinemaware who produce wicked games for the 16-bitters, Electronic Arts, Origin and a few others, but in general software houses don't seem to make the most of individual machines.

Daniel Walker, Reigate, Surrey

There does seem to be a general lack of innovation in the games market these days. I remember when programmers and publishers sought to get the competitive edge by pushing the Spectrum beyond its limits. These days, the competition seems to take place in the boardroom rather than inside the computer – to my mind, companies seem to spend more time chasing licences than they do in the pursuit of innovative excellence.

H F-W

■ Piracy: the last words...

It was with some surprise that I read the remark by Bob Hay of FAST in your latest issue. He said that you won't find any games software houses that advocate that people need to make a backup.

Well what about these words, taken from the instructions of World Class Leaderboard? "We encourage you to make duplicates of World Class Leaderboard and use the copies for normal play. If you keep the original in a safe place, you will always be able to make new Backup copies to replace lost or damaged disks."

Obviously, I should point out here that I purchased my copy of the game from a reputable chainstore – it's not a pirate version.

If you purchase software and back it up, you are not committing theft. To say that copyright is infringed by this practice is going a little too far – would you want to fork out twice for an expensive program just because some bumptious commercialist made you feel guilty about the idea of backing up? I think not. Unfortunately, not all software houses are co-operative about replacing damaged disks.

Bob Hay should concentrate on dealing with all the freeloading scum, not those who, like me, make backups of legitimately purchased software.

Struan McTavish, Poole, Dorset

Fair comment Struan, but according to the letter of the law, Bob Hay is perfectly correct – if a software publisher does not give you the right to make a security backup, then taking one becomes an illegal act.

And it's but a short step from taking a legitimate backup copy and keeping it safe in case of disaster, to taking a couple of backup copies and swapping them with friends...

H F-W

■ A pirate writes...

I do believe that software piracy is legally and morally wrong, and I do feel bad when I pirate software. But I'm pretty sure there are far more pirates than honest people – larmers. And I feel the blame for ever-increasing piracy rates lies with the software publishers.

Software publishers have made a step to stop pirates, but in the wrong direction. FAST and ELSPA are a complete waste of time and money, and the poor old larmers out there end up paying for them in over-priced software titles.

If the software companies got together and stopped spending time and money on elaborate protection schemes, this would achieve dramatic results. First of all, the price of software could be dropped – it's a fact that software on the ST and Amiga is badly overpriced. And all the groups of crackers would stop because they wouldn't have any protections to break – all they could do is write the scrolly demos. Finally, all the pirates like me would be able to afford original software rather than copying it – believe you me, I would rather own a nice boxed original with all the documentation than a copy with no instructions.

I realise that this method wouldn't stop all pirates, but I feel that it would cut down a vast amount of the piracy that takes place today.

'One of many pirates'

You've really got a problem, haven't you pal? You feel bad about stealing, but carry on doing it.

Your answer to the problem is for software houses to make it even easier for you and your chums to steal things, and reduce the asking price. All that would happen is even fewer games would be sold, software houses would go bust and before long there wouldn't be any games for you and your chums to pirate.

Which wouldn't make me particularly sad. I'd be sorry for all the software houses and the people you call 'lamers' – the honest people who have pay high prices for games. Prices that are artificially inflated by the activities of people like you.

H F-W

■ Legal, decent & honest

In my games collection I have over 100 games including *Turbo Outrun, Tetris* and *Starglider.*

The total cost to me of these three games was under £10. I am not a pirate. I purchased these games from mail order companies. *Turbo Outrun* cost me £3.99, *Tetris* £1.99 and *Starglider* £2.95. Why can't 'playground' pirates buy games from legitimate companies like the ones I use?

Another way to get cheap, quality software legally is to buy budget games, In my local software store I've seen games such as *IK+, Wizball* and *Green Beret* for £2.99 each.

Surely the pirates' main argument that software prices are too high cannot be justified?

Andrew Cooper, Kildary

No, it can't. It's as simple as that. H F-W

MAIL SHORTS

■ Live and kicking

ONE OF HAYDN'S £5 WINNERS

While watching TV this morning, the Betty Boo video for 24 hours came on. At the start, I noticed that Betty was using a C64/128. This is proof that the C64/128 is not dead yet!

Gareth Harper, Londonderry

Well spotted. Have a fiver!

H F-W

■ Musical youth

I consider myself to be a competent quartet musician, and would like to become a commercial musician in this area. The problem is, I have little relevant programming experience, so cannot present the music in an attractive way. Do you know of any way I can get around this problem?.

Kevin Wright, Romford, Essex

Well, I hate to state the obvious, but what about using a tape recorder? If you're looking to combine your tunes with games – then you can leave the twiddly programming stuff to the programming team and concentrate on the music.

By the way, we're running a special music supplement in three weeks' time – make sure to get your copy of *Express* on Thursday 31st January.

H F-W

■ Rant

OK bigot, what's the gender of someone called Sam or Beverley? Can you tell a Lewis from Lois or Francis from Frances?

I know Eddie Dodds is a bloke, and a good 'un too. What's the gender of Fairground Attraction's Eddi Reader?

For those too young to know, she's the lead singer.

Richard Robson, Teesside

Er, yes. But the point I was making in *Express* 110 was that men were teaching on the women-only computing course... Oh never mind!

H F-W

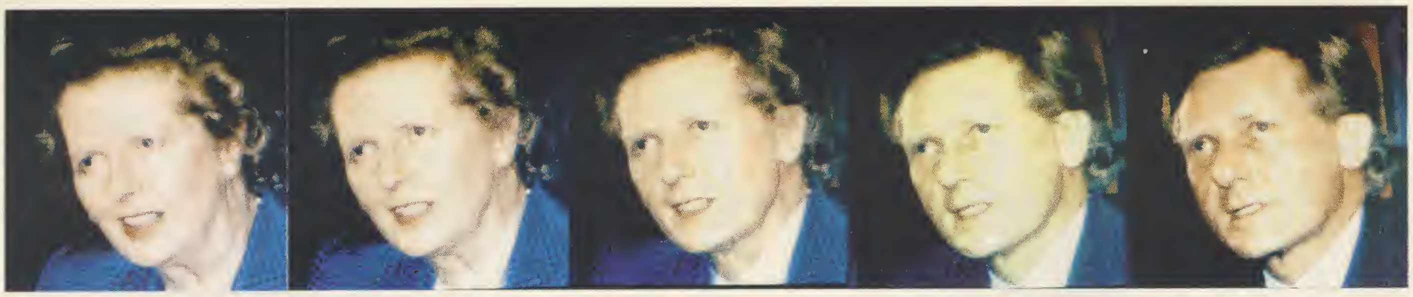
■ Cartridge conundrum?

The belief that expensive cartridges (*Express* 110) will stop piracy is not going to fool a retarded six-year-old. The only way to stop piracy is to make software so cheap it is simply not worth pirating.

D Griffith, Shepherds Bush, London

On that basis, you could make it so bad, that it's simply not worth buying in the first place, I suppose.

H F-W



CHANGING FACES

Complex computer graphic techniques can be used to manipulate and distort any kind of image. Psychologists are researching into its effects in both theory and practice, so Express went to find out how they work.

Phil Benson is a member of the team at The Department of Psychology at St Andrews University, Fife, which is researching the theory and practice of computer manipulation of images of the human face. The department has also been studying the effects of caricatures on the reception and recognition of such images. Stewart Lowe talked to him.

When did work on the project begin?

It began three years ago funded by the Economic and Social Research Council, and it will continue until the end of 1992 funded at the start of next year by the Science and Engineering Research Council (SERC).

Which other universities are involved and what specific areas are they looking at?

There are five other sites based at Aberdeen, Durham, York, Nottingham and Cardiff.

Durham and York are looking at various aspects including how people are affected by seeing the name of a person on the computer before seeing the picture of that person or someone else. They are also looking at clinical patients who have suffered brain damage and cannot recognise or identify faces even those of their spouses.

At Nottingham, amongst other things, they are trying to find out what it is about a face that makes it female or male.

We're collaborating with Cardiff at the moment looking at children's perception of facial caricatures.

Moving on to the technical aspects; as you are approaching this subject from a psychological point of view, what special problems have you encountered?

Previous problems concerning facial caricatures were that people tended to use mixtures of images; comparing a real picture with a drawn caricature. Comparing two different media is known to have different impacts on the way you see images.

A couple of groups started looking at line drawing caricatures, but we sought to extend this to produce real photographic quality images, distortions of faces. The problem with that was that these images have got to be of very high quality and you've got to have some smart way of deforming these faces to make them look like photographs, but nevertheless effective caricatures. However, problems with distortion of the original image space arose because of the different kinds of affine transformations which can appear when a portion of an image stretches or contracts or rotates or reflects.

And how did you overcome these problems?

With a general purpose routine which can handle all of these transformations in a consistent way. This is an ongoing thing. Every time you try a new and more bizarre effect you find that the software perhaps doesn't perform as you thought it would. You go back and make sure it still works for all the previous cases.

What hardware/software combination is used to develop this system?

It's based on two systems. There is an PC compatible system used with a Pluto framestore which allows us to grab images from photographs or video. These files are transferred onto Silicon Graphics Unix-based workstations where all the hard work gets done.

Once the images are on the workstations, the Iris as its called, the facial features are manually delineated using software we've written to extract accurate line drawing representations of a person's face. If you take many faces and average the two dimensional cartisian positions of each of the feature points then you end up with an average face, a norm.

Caricatures are produced by comparing the differences in feature positions between the normal face and the original face, and where you find a difference you exaggerate it.

> **" We can produce the average 22-year-old female. The average face is always more attractive "**

So if the person already had a big nose and you compared it with a normal face which doesn't have a big nose then you make that nose even bigger. That forms part of the system, it actually forms a frame of reference which we actually use to distort the original images. Once you have produced these line drawing caricatures you know where the original nose is going to distort into in the final image, so it's a long-winded process but that's basically how we do it.

What is the minimum hardware configuration needed to run this software?

At the moment the only implementation is on these Unix workstations, but it is feasible to implement the system on PC as long as it has got 8-bit graphics to display at least a grey scale image.

What has the system proved capable of so far?

By using these caricatures we've managed to enhance recognition of famous faces. We've also increased the accuracy with which people are able to name an image in caricature.

We've formed age transformations from people's faces. We've taken someone who's 40 years old and turned them into a six-year-old with a few intervening steps. The skin textures, the pixel intensity, the brightness values are identical all the way through, it's just the configuration that's changing.

We've been able to synthesise average faces by blending numbers of faces together. For example we can produce an average 22-year-old female.

One experiment used attractiveness ratings for a number of faces, and it turned out that the average face was always more attractive than any other. This goes against intuition but is on a par with some of the psychological research that has been done.

How do you envisage this system being used in a commercial environment?

It's something we're looking into at the moment. It is possible through looking at average faces to find out what it is about the face that changes so much with age and why, for example, women want to put so much make-up on when they are older to try and make themselves look younger.

Enhancing faces is also useful for a missing person. Mrs Smith comes in with a picture of Johnny at 15 years old. He hasn't been seen for 10 years, but we can take that picture of him when he was 15 and age it so that now we've got a synthesised picture of him at 25.

There is another system available in Britain as a commercial product at the moment which actually works from three dimensional laser scanned images of faces. It's for corrective surgery and facial deformations. Providing we had a model of what would be a normal face for that person then we could transform their face. Whether or not the corrective surgery afterwards comes up with the same thing is another matter. That's the surgeon's talent.

From a marketing point of view when will your system be commercially available?

Given the time I think possibly autumn of this year it will be available on a PC-based system.

And how much will that be likely to cost?

It depends who buys it. For example if it's within the face recognition group in Britain then they will get a cheap or free copy, depending on how much time is to be invested in it.

For a commercial system it depends how much they want and what they want to do with it and whether they want to buy a complete system including the hardware. What we were initially considering was selling just the software to do it. It may cost something like between £300 and £500 for a system.

What further enhancements, if any, are planned for the system?

At the moment it exists as separate modules because very often there is so much development work going on we need to be able to get in and change things quickly.

The software runs on two workstations at the moment. We'd ideally like to have everything integrated into one complete system which it will have to be to port it to a PC.

Problems might occur making sure it runs consistently on a PC and perhaps making it run faster. At the moment everything is fine – we run it in a RISC workstation and it's very fast, but on a PC it might be problematic, we might have to stick a transputer in a PC or something to make it more realistic. But with hardware developments in the PC market it might not be so much of a problem.

We'd like to spend just over a month revamping the system, putting a new graphical interface as a front end to make it much more usable so that anyone who wanted to generate a caricature for themselves could come along to the system, roll up their image of a face and generate a caricature very quickly.

Generally speaking where does Britain lie in relation to her rivals in terms of graphics system development?

Things like the workstation development have been virtually sold off to the Americans and Japanese. Our graphics hardware is American, but having said that there are specialist systems available and used by graphics agencies. A lot of them now are using the transputer technology which was developed in Britain, and in particular things like the Meiko computing surface.

> **"Industry is begging for the technology . . . in 10 years time there will be some incredible developments"**

What about the software side? Is Britain in the forefront as far as that is concerned?

Well everyone's got their own idea of what's good and what's bad about the graphics software. The Americans have always been in the lead for this, they have more money available and offer dedicated degrees in computer graphics at some very specialised institutes like Massachusetts. So they are training people to be very very proficient in the skills required to develop graphic systems. I don't really know how good Britain is.

Is the gap between the American and Japanese and the European countries opening up rather than closing down?

In some respects it's opening up but with hardware prices coming down, more and more public domain graphics libraries, like Kuros and Grass, are becoming available.

High level tools are so accessible by people all over the world to render ray-traced images, for example. An arbitrarily complex image can be done by anyone – even a person with only a PC. The barriers which used to exist, built by these specialist graphics companies producing dedicated hardware and very expensive workstations, don't necessarily need to exist now.

What capabilities do you see graphics recognition systems having in 10 years time?

Machine recognition of both static and dynamic scenes has come a long way especially over the last five years. Again the availability of high powered hardware changes things. Face recognition systems will hopefully be able to perform many of the tasks we take for granted now. This will have to be knowledge-based systems.

There's going to be much collaboration on that side of things between physiologists, psychologists, computer scientists and engineers. Machine vision for dynamic scenes, like robot vision, is very, very good at the moment. That will continue to develop.

There's so many people working in it especially in Britain, America and Japan because they have an incentive to do it. Industry is begging them to produce the technology which can recognise and segment an image and hopefully recognise objects within an image. So certainly in 10 years time there will be some incredible developments.

In addition there's the machine recognition and vision systems. We've already got onboard vehicle systems – a car can effectively drive itself by watching the sides of the road. Of those still experimental systems a lot of them are very reliable indeed – you could feel quite comfortable sitting in this car. ■

PRESS THE FACE

Steve Caplin and Paul Jeremy have taken the conventional idea of the hand drawn caricature and put it onto a Macintosh. They have a regular strip in the Guardian *on Saturday and a full page photo story in* Punch. *Here they talk to* Express *about their work.*

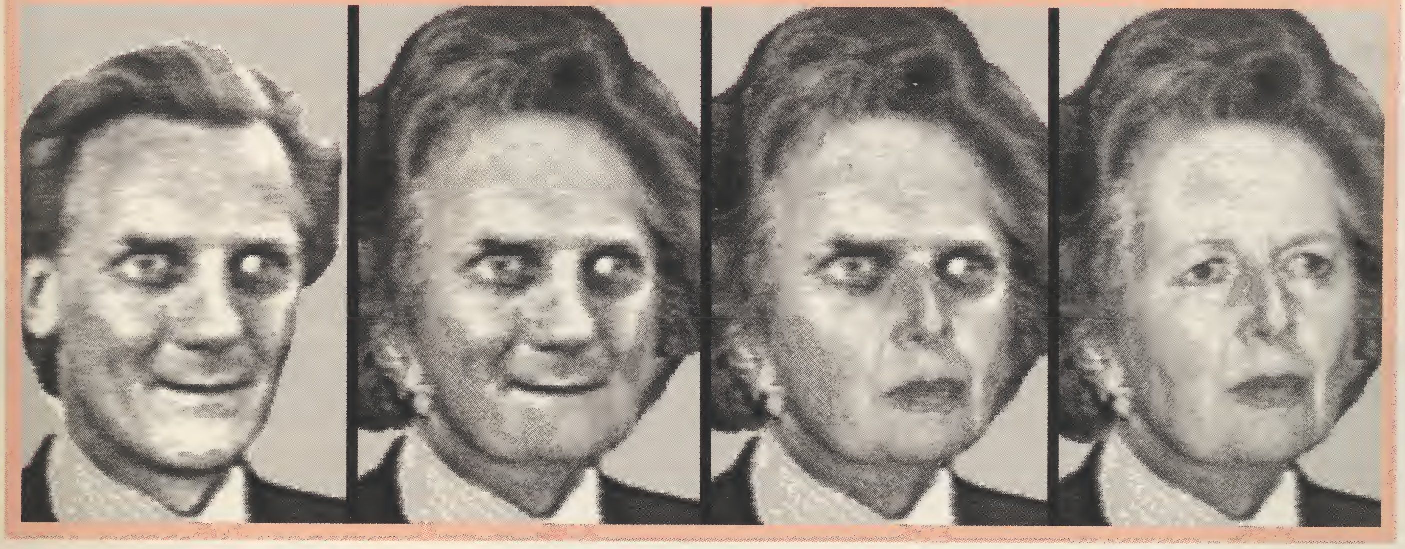
Transforming one politician into another is always a popular feature of our work for *Punch* and *The Guardian.* Over the last year we have transformed Mrs Thatcher into Madonna, Prince Charles into a Georgian edifice, Neil Kinnock into a turnip and Kenneth Baker into a horny toad (with the memorable caption Flog it Flog it – Grabbit Grabbit – Rabbit Rabbit – Ribbit Ribbit).

The first step is to find two pictures taken from the same angle - which is more important than it sounds; suddenly finding you're on the third frame with an extra ear to add can cause problems.

In the Thatcher/Heseltine instance we used a press photograph of Mrs Thatcher, with a still of Michael Heseltine which was grabbed from a video tape of the previous night's news. The two images were then taken into *Image Studio* for manipulation.

Surprisingly, the shape of the face makes little difference to the reader's perception of a personality. The first frame is pure Heseltine, in the second, all that remains of Heseltine is his eyes, nose and mouth (and that oh-so-cute dimple).

The third frame, where we start to mix the features, was the hardest. The image must resemble both the preceding and the following image - which are often quite different. We experimented with changing various aspects of the face until we hit on the piercing eyes – the third frame is entirely Thatcher apart from those lustrous orbs. The eyes took on a meaning of their own. What had been tired, smiling eyes became wild and fearsome in the context of Thatcher. If the real Margaret Thatcher had eyes like that, she would doubtless still be Prime Minister.



• During the recent battles for the Conservative Party leadership, images of Mrs Thatcher changing into Michael Heseltine were seen in national newspapers. These were produced using complex UK computer graphic techniques.

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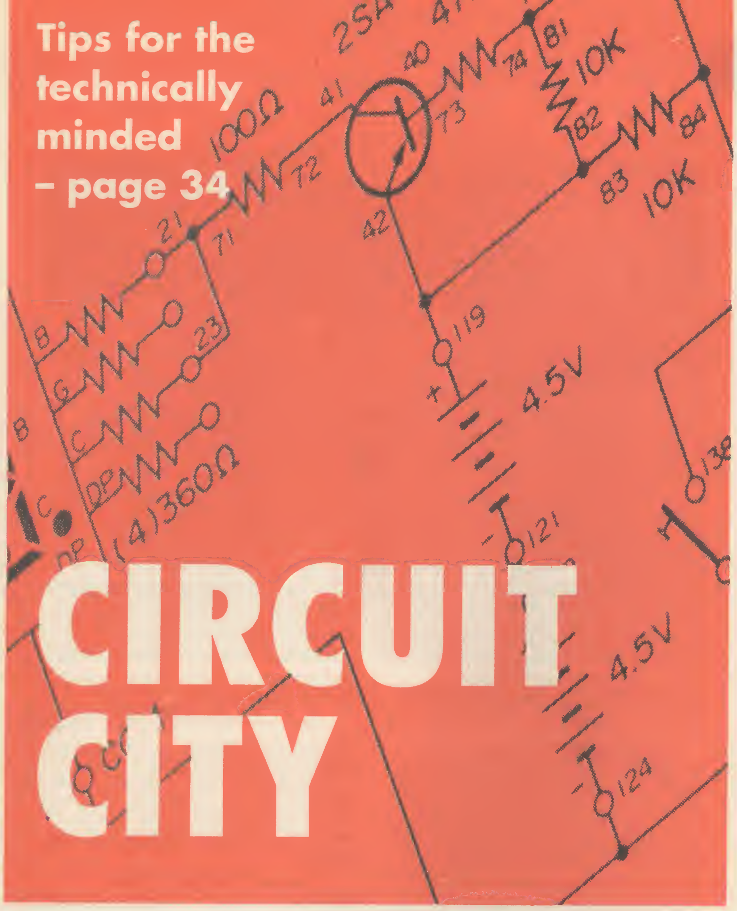

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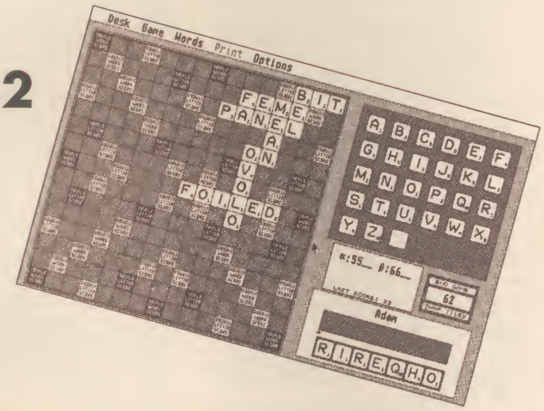

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Macintosh

PROTECTION FROM INFECTION

Does the thought of viruses on the Mac leave you in a cold sweat? Well, perspire no more. This week, we look at what they are and how to avoid the little buggers.

The first thing to say on the subject is DON'T PANIC! Yes, viruses on the Macintosh are a problem, but not half as big a problem as on, say, the PC. None of the Macintosh viruses so far around actually do anything more harmful than, say, making your machine crash more frequently than it would normally. PC viruses, on the other hand, have unpleasant habits such as erasing hard disks, so we can count our blessings.

In fact, unless you have a virus checker that tells you your Macintosh is infected, it's often very difficult to tell whether a virus is present or not. If your screen suddenly starts looking like a TV with heavy interference, or a file suddenly disappears from your hard disk, it's far more likely that your machine has just had an innocent crash than that a virus is at work (indeed, no viruses so far cause either of the above symptoms).

So don't start rushing about like a headless chicken at the first sign of abnormal behaviour from your machine; although usually very well behaved, it sometimes seems as though abnormality is the norm with the Macintosh.

SAFETY MEASURES

All viruses spread by copying themselves from files which are infected to other, uninfected files. So, for instance, it's impossible for a virus to spread to a floppy disk which is locked (write protected) – none of the files on that disk can be altered, so the virus can't be copied.

However, do remember that a virus can spread from a locked floppy to, say, a hard disk, because the hard disk can't be write protected.

There are a number of safety measures which you can take to ensure that your Macintosh remains virus-free.

- Ensure that you have some anti-virus software on your machine, **and use it regularly!** It's no good having all the latest checkers if you never use them.

Anti-virus software comes in two basic types: software which checks any disks which are inserted for infection and warns you before the virus has a chance to spread, and software which runs a check on all the files on a disk – but only when you tell it to do so.

Most commercial packages contain both types of software, and there are a number of different packages from which to choose. Two of the most popular are *SAM* and *Virex* – both of which are available from most software dealers.

However, the problem with commercial offerings is that when a new virus appears, the software must be updated to check for the new intruder – and those updates often cost you, the user, money. Some commercial anti-virus program writers charge an annual fee, which entitles you to all upgrades for the year; but that annual fee can often be £60 or more.

Fear not for your bank balance, however for help is at hand in the form of a program which I have mentioned before – *Disinfectant*, by John Norstad. This is a free program – not shareware, but actually free – which many feel is the best anti-virus package available. It contains an INIT to check disks as they are inserted, as well as the main scanning and disinfecting application. Even better, upgrades appear almost as soon as a new virus is discovered – the present version is 2.4.

- Lock floppy disks whenever possible before inserting them into your Mac.

POSTCARD FROM AMERICA

Here's a byte of advice that most users do not like to hear: *Your computer knows better than you. Trust what it's telling you.*

I've received frantic phone calls from users who have lost hours, days, weeks and even months of work because they didn't pay attention to what their computers were trying to communicate.

This thick-headed bunch won't make the smallest effort to listen to their digital buddy. They ignore frantic error messages and beeps from their applications, warning of impending danger. They're too busy to be bothered with such things – they've got important work to do! Perhaps these are the same people that ignore posted caution signs, and insist on pumping gas with burning cigarettes in their mouths?

Just as bad are the users that ignore the out-of-the-ordinary hints that a problem is brewing. A paragraph on the screen is inexplicably turned into alphabet soup, but the fingers keep on typing away. Each cut and paste advances their work toward the dreaded bomb.

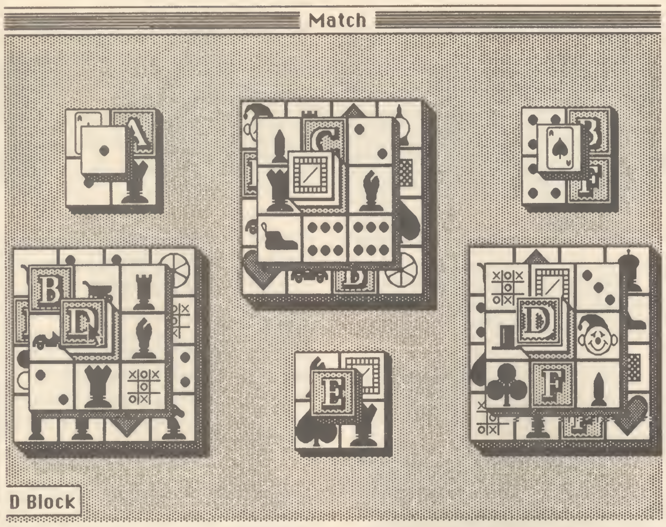
A commonplace action is prevented for lack of memory. "Impossible," you say, "I have 5Mb of RAM." If your computer, operating system, or application thinks otherwise, who are you to tell them different? You can yell all you want at these naughty children, but they'll never listen!

Instead of getting angry, in a warped way proving something to an inanimate device, the wise user will save their document and get out of town as soon as possible. Restarting does wonders for transient software problems, called in the trade, *anomalies.*

Even programmers treat these annoyances as digital weather. The on-line Hacker's Dictionary calls them *obscure*, "used in an exaggeration of its normal meaning to imply a total lack of comprehensibility. 'The reason for that last crash is obscure.' *Moderately obscure* implies that it could be figured out, but probably isn't worth the trouble."

So listen to your Macintosh. Maybe surprise it with a gift – a little RAM, a monitor cozy, or a utility program. The two of you will be very happy together!

David Morgenstern



• *Space Invaders it ain't, but Mombasa is ideal for those whose idea of relaxation doesn't involve simulated genocide...*

That way, if you already have a virus on your hard disk, it won't be able to spread to the floppy. And use copies of software – not the original disks.

● Don't just trust that new software won't be infected – check it!

● If you discover that you have a virus, warn anyone to whom you have given disks in the recent past; they may be infected. Likewise, if you receive a disk from someone which is infected, warn them; they probably don't realise that they have a virus.

TROJAN HORSES

There is another form of unpleasant software which can attack Macs – Trojan horses. These are programs which claim to do one thing but in fact do another, normally something nasty.

Fortunately, these are rare, but you should know about them. The main Trojan is a HyperCard stack called 'Sexy Ladies'. This displays pictures of, yes, women in various stages of undress, but at the same time it trashes the hard disk – a high price to pay for a bit of titillation.

There are reports of another Trojan horse called ATM 3.0, although this is unconfirmed. If you use Adobe Type Manager (ATM), the current version is 2.0 – if you see 3.0 anywhere, don't touch it with a bargepole.

Finally, there have been recent rumours of a program which actually destroys the main logic chip of LaserWriters when it's run. Again, however, this is unconfirmed at the present time.

DON'T PANIC!

Just to reiterate, you shouldn't worry too much about viruses on the Macintosh. Just be warned that they exist, and check your system for them every week or so. *Disinfectant* is available from user groups, bulletin boards and public domain software libraries.

If you really can't find it anywhere, send a disk and an sae (with the adequate postage, please!) to me c/o *Express* and I'll stick a copy in the post to you.

ON A LIGHTER NOTE

Just a quickie. If you feel the need to relax from time to time but don't like arcade-style shoot-'em-ups, try a game called *Mombasa*. It's rather more cerebral than *Space Invaders*, and a bargain for its £5 shareware fee.

To play, you remove matching tiles according to a set of rules. Simple to learn, difficult to win and addictive. Well, it beats *Patience*, anyway!

Ian Wrigley

PC

SHAKY START FOR THE CONSOLE?

Early reports suggest the new GX4000 console hasn't exactly been selling like hot cakes over Christmas. What's going on? After all, the machine knocks the socks off the Sega Master System and Nintendo Entertainment System...

But then if it's any consolation to Amstrad, the Plus machines would appear to be doing rather better. In both cases, however, it's going to be a few months before any real conclusions can be drawn – and any sales figures pulled together, for that matter.

The factor that's probably done most harm is the current economic climate, with most families groaning under the weight of sky-high interest rates and practically zero disposable income.

Over in France, on the other hand, the GX4000 would seem to be going down a storm, judging by the press. Maybe the French have got more money. Grr...

GAZZA II

Anyone remember *Gazza's Super Soccer*? No, and I don't blame you. So it was with mixed feelings that I regarded this innoncent-looking ROM sitting on the desk in front of me.

Yup – a console game. Called *Gazza II*, it was left in my tender care by those good people at Empire just the other week...

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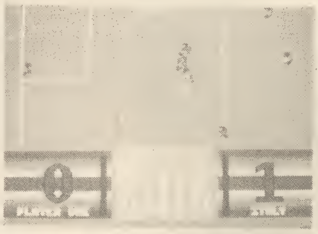


• Gazza II on the console sets whole new standards for Amstrad footie sims. It's just so fast and so, so playable...

Right then, after carefully pushing the ROM into our carefully-butchered cartridge, I slid it into our 464 Plus, switched on, and...

It's brilliant! For a start, it looks just like *Kick Off* on the ST, plays just as fast but is even better! Basically, it's a very simple game. You collect the ball by running into it, and you carry on dribbling until you press the Fire button. Then, a little 'kickometer' bar at the bottom of the screen rises, and you let go of the button as soon as the required strength is reached.

As usual, the player selected is the one nearest the ball. Fine under most circumstances, but your eager team members do occasionally get too eager, all clustering round the ball and making it difficult to work out who's going to pick up possession.

The other thing is that there are no rules! Well, there are no fouls, at any rate. The gameplay really has been kept as simple as possible, with your only options being choice of opponents at the start and match duration. What you do have is a small map of the pitch at the bottom of the screen, which shows you where all your and your opponent's players are and which allows you – with practice – to plan some pretty smart tactical moves.

Simple it may be, *Gazza II* is also incredibly playable. The best thing of all is that passing is not only possible, it's quite easy! This is one area where just about all footie games so far have fallen down. With *Gazza II*, however, you can not only control the strength and direction of your kick, you can also decide exactly where you want the ball to go from the tactical 'map' screen.

Beyond that, there's not a lot to say about *Gazza II*. It's blindingly fast, end-to-end stuff with little real gameplay but an incredible fun factor. As ever, though, it really takes a human vs human match to get the blood boiling.

Gazza II on the console bears almost no relation to the naff original. In playing speed, graphical quality and sheer playability it simply sets new standards for Amstrad footie games.

Being on cartridge, *Gazza II* takes a pretty fair chunk out of your wad. But at £24.95, it's still only the price of a 16-bit game.

CHEAP CLIP-ART

If you're into DTP on your Amstrad you'll probably have dabbled now and again with introducing graphics into your pages. Unless you have a smidgeon of artistic talent, however, your attempts may be less than inspirin.

Which is why PCW World's latest offer is rather interesting. The user group is offering a number of clip-art-packed disks for just £4.95 each. The artwork has been collected from the public domain and modified for importing into DTP programs like *Stop Press*. Although the packages were designed for use with Amstrad's techie PCW machines, they're perfectly compatible with the CPC.

Each disk has about 120 bits of clip-art on it, and if you're a member you get £1.70 off the asking price, dropping it to a mere £3.25.

You can get in touch with PCW World at: Cotswold House, Cradley Heath, Warley, West Midlands B64 7NF. Or you can call 0384 66269.

DIAL A COP

What do you think of 0898 numbers? Good fun, or an absolute waste of money? I know what I think, but I'll leave you to make your own mind up over this little venture...

Robocop fans can now embark on an interactive adventure all their own, just by dialling up a number and answering yes or no at various points in the narrative. The answer you give determines the next sequence of events, and in this way – in theory – you can star in your own *Robocop* adventure.

Well, I thought, let's give it a go... I called up the number, listened to a lengthy intro narrative (I'm glad Future Publishing was paying the phone bill) before the action started. Then, I only had to make a choice every thirty seconds or so – the rest of the time was spent listening to a drawling American accent describing the action (or inaction). Crikey – I was on the phone five minutes and I still didn't get to blow anyone apart!

If you want to give it a go, the number's 0898 345678, but if it's not your phone, make sure you've got permission (And a healthy bank balance)!

MORE MULTIFACE POKES!

These are all for tape versions of the games listed. They might work on disk versions, but I'm not promising anything!

Max Headroom

```
12A5}  00   Inf energy
12B7}  00
12D0}
```

Space Trader

```
74CD   FF   255 shields
74CC   FF   255 lasers
74CE   FF   255 exterior
74CF   FF   255 interior
74D0   FF   255 computer
4DFA   No   Cash
```

Dandy

```
570C}  06   9990 energy
570D}  27
5710   FF   255 keys
570E   FF   255 spells
```

Rocky Horror Show

```
2413}  FF   255 time
2414}  FF
```

Dynamite Dan

```
2DBE   07   7 dynamite
```

Quest for Mindstone

```
5BBF   FF   255 gold
5C91   FF   Kyle  strength 255
5C92   FF   Merle strength 255
5C93   FF   Quin  strength 255
5C94   FF   Taina strength 255
5C9B   FF   Kyle  psyche 255
5C9C   FF   Merle psyche 255
5C9D   FF   Quin  psyche 255
5C9E   FF   Taina psyche 255
```

Rod Lawton

Amiga

LIFE IN THE FAST LANE

The Amiga's 7.14MHz clock speed may seem pretty impressive to those users who have upgraded from the aging 8-bits, but sooner or later most come to the conclusion that it still isn't fast enough. If you're using your Amiga for applications such as DTP, CAD or even ray tracing, the Amiga's poor old processor seems to operate at an almost snail-like pace.

The answer, of course, is a processor accelerator. You've probably seen countless advertisements for these little beauties, but they always seem to be so damned expensive. Even a fairly basic '020-based card will set you back at least £400, while a top of the range '030 card with maths coprocessor and 32-bit RAM will break the bank.

However, help is at hand. Silica Systems has just launched what it believes to be one of the most cost effective processor accelerators available. For just £200, you can have a board which will speed your Amiga up to a more useable 14.3 MHz.

Unlike devices such as the 20-Card and A5000, the AdSpeed card isn't based around either an '030 or even an '020. Instead, AdSpeed employs a much faster version of the 68000 (backed up by a 32K RAM cache), therefore ensuring 100 per cent compatibility with all Amiga software (unlike some processor accelerators I could mention!).

Another advantage of this approach is that the card works on all Amiga models – even the A1000 – so if you upgrade your Amiga 500 to something like a 1500 or a 2000, the ICD card will continue to be of use.

Performance wise, the card certainly seems impressive. In a number of benchmarks sent to me by Silica, the card managed to consistently run at about twice the speed of a standard Amiga. Most applications (and even some games – *Virus*, *Hard Drivin'* etc) should benefit from the card. Those that will especially benefit include DTP packages (*ProPage*, *ProDraw*, *PageStream* etc), CAD packages (*X-CAD*) and any solid modelling and RayTracing package (*Sculpt 3D*, *VideoScape3D* etc).

If some products don't like running at an increased speed (or you can't handle the extra performance), there's even a 7MHz fall-back mode.

The card itself is fitted as a replacement for the standard 68000, so there's no soldering involved. Interested? If so, then give Silica a bell on 081-309 1111. Expect a review as soon as my sample arrives.

ATONCE UPDATE

Users of Vortex' acclaimed AT emulator, ATonce, will be pleased to learn that there's yet another software upgrade nearing completion that offers two new screen modes – EGA and VGA.

Before I raise your hopes up too high, however, the news is that they are currently mono only. To achieve a true VGA display running on an Amiga screen, you'd really need some extra video hardware.

UK distributors, Silica Systems, has hinted that the new 386-based version of ATonce will have the extra hard built into it, so it looks like we're going to have to wait a while yet before we'll be seeing a true VGA-display running on an Amiga screen.

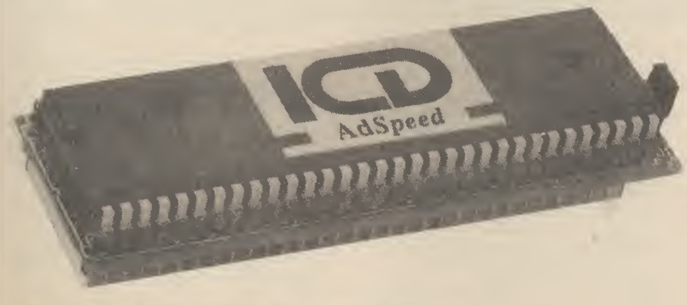
On the subject of ATonce, gremlins crept in during my recent review of this product. The performance figure which I quoted for ATonce wasn't actually correct – instead of 2.8, the figure should have been a far more impressive 6.4. I hope this didn't discourage anyone from buying the card, which is undoubtedly an impressive product. For more, give Silica a bell on 081-309 1111.

IN A JAM

Amiga fanzines are a little thin on the ground for some unknown reason, but those that are available are top notch. I've just received the latest issue of *JAM* (*Just Amiga Monthly*) which is produced by that well respected computer journo, Jeff Walker.

Jeff has worked in publishing for a number of years on both fanzines and 'real' magazines (no names named, though), so you can bet that he knows a thing or two about chucking together a decent read. As you'd expect from a magazine dedicated to such a powerful machine, *JAM* also looks good; Jeff actually uses an Amiga 2000 running *Professional Page 1.3* to produce the entire mag, so the quality of layout is of the highest possible standards.

But enough of plugging Jeff, let's get on with plugging *JAM* instead. Published every month (well, it would be with a name like' *Just Amiga Monthly*'), *JAM* contains a healthy serving of news, product reviews and features. The latest issue includes a look at *Workbench2.0* running on the A500, a round up of PD C Compilers (with a review of DICE, the latest arrival), a review of *PowerPacker 3.0* and the start of a new series on desktop publishing on the Amiga. There's also a super helping of news, letters and technical advice.



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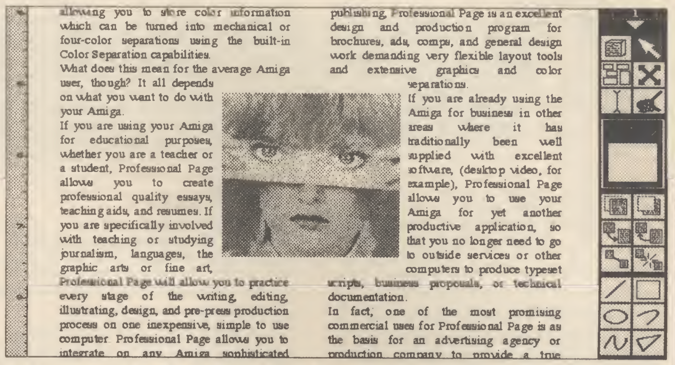

allowing you to store color information which can be turned into mechanical or four-color separations using the built-in Color Separation capabilities.

What does this mean for the average Amiga user, though? It all depends on what you want to do with your Amiga.

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JAM is available on subscription only for £19.95 for twelve issues. If you don't feel like taking the plunge straight away, then for just £1.50, Jeff will send you a taster issue which he's sure will more than convince you to commit yourself to a subscription.

For more information, give *JAM* a bell on 0895 74449.

PROPAGE 2.0 LATEST

Details are finally emerging about Gold Disk's latest upgrade for its acclaimed Desktop Publishing system, *Professional Page*.

One of the most notable additions is style tagging (also called Style Sheets) which are a bit like macros for defining type styles. *ProPage 2.0* allows you to set up an unlimited number of these style tags which can define font, style, size, line spacing, tracking, baseline shift, justification, kerning and hyphenation. With a stylesheet defined, you select the text you with to modify, select the appropriate style tag and the text is changed in an instant.

It's been a long time coming, but *ProPage* now has its own built-in word processor, therefore allowing you to edit copy much easier. Based on Gold Disk's well respected *Transcipt* system, the word processor even includes a 90,000 word spell checker.

For really fancy effects, you can now rotate boxes at any angle either numerically or with the mouse. Combined with *Professional Draw*'s powerful text warping facilities, there's now very little that can't be done with text within ProPage.

Multiple pages can now be previewed onscreen simultaneously. You can also view up to six pages at a time, therefore giving you a much better idea how your overall layout will look without having to dump it all to paper. Then, of course, there's *ProPage*'s new Pantone Matching System which allows you to select a colour simply by clicking on any one of the 65,000 colours defined. Using extensive dithering, *ProPage* gets around the Amiga's 16 colour limit (in hires), therefore allowing you to see a theoretical 1000 colours onscreen.

For more, give Silica Systems a bell on 081-309 1111. Also, you can expect a full review very soon.

Jason Holborn

Archimedes

SCHEMA

The long wait for a RISCOS spreadsheet is over: Schema is finally out and Clares has been shipping the finished product for a month or so. I previewed Schema in *Express* 95, so here are my impressions of the real thing.

It's the only 'traditional' heavy-duty business spreadsheet for RISCOS (ignoring Minerva's *DTOSheet* element of the Desktop Office suite) and in use is a lot like Microsoft Excel on the Mac or PC. On-screen, it's fully multi-tasking, with the traditional rows and columns presentation capable of being spruced up with colours and text in different typefaces and sizes.

Schema will set you back a fair-sounding £130. The presentation of *Schema* is good, with a couple of 'wobbly' areas. The plastic wallet it comes in is one. I much prefer the kind of cases that *Impression*, *Ovation* and *FlexiFile* come in, and they fit the bookshelf better too.

Some perplexing typos and downright errors in the manual suggest a little more proofreading was needed, but all the information you need is there.

Installation is easy. Just copy the lot to hard disk or to a new set of floppies. There is an 'installation program' to help you customise the Run file (setting it up for either 1Mb or big machines is one choice, as it uses overlays when memory is tight).

The first real barrier is 'what do you do with the mouse?' It's a mite confusing, until you read the section of the manual that introduces the 'long click'. Select, but real slo- o-o-w.

And the different modes for entering and editing existing formulae make the first twenty minutes or so less than smooth. A fter that, it's a doddle if you've ever used a spreadsheet before.

It looks good on screen too, as you can control colours, fonts, number formats, leading and trailing characters and so on through a system of styles not unlike DTP paragraph styles. Columns and rows can be varied easily in size too, just by pulling the grid lines with the mouse.

All the maths stuff is there, and there's a set of statistical, financial and time functions too. It's a very complete set, but can be extended through the macro language. If there's a function missing, you can write it yourself.

The details look impressive. You can load or save parts of spreadsheets, sort blocks by row or column, create graphs, do linear regression and exponential curve fitting. The manual explains these well, but it's a little dicky on what happens if you sort cells containing formulae.

The macro language is a good idea, and we'll be seeing more of these on Arc software in 1991. It's not really a full programming language. You can control almost any aspect of *Schema*'s internals, add new options to the menus and so on, but it's weak on links outside the system. For example, there's no filing to read or write non-*Schema* files, (though you could do it through the SYS call). Macros are really meant for defining your own functions, or for enhancing the graphs: someone could make money selling a set of macros to draw the snazzy 3D-style charts so fashionable in business presentations at the moment, as the built-in set of charts are unremittingly dull and worthy.

There is a utility to read and write *Lotus 1-2-3* files, but the most glaring ommission is a *ViewSheet* converter, which could have eased the transfer for many prospective buyers.

Above all, *Schema* is the spreadsheet RISCOS needs, a traditional spreadsheet with a few new twists (like saving your sheet as a Draw file). When conceived, Acorn clearly meant it to have the same catalytic effect on the Arc in the business world as did *Excel* on the Mac. It's probably too late for that, but *Schema* is well up to some heavy use.

Tick, VG. Clares is on 0606-48511.

COMPANY NEWS

Oak and Software Solutions have merged to form a new company called, wait for it... Oak Solutions.

Oak is best-known for supplying hardware like its SCSI interface, and for CAD software like the *Parametric Design Tool* and *WorraCAD*. Software Solutions is the company responsible for *Genesis*, useful Econet software like Spooler and Sharer, and for the development of Acorn's forthcoming Level 4 Econet file server. This and the Genesis 2 upgrade are to be released at the BETT '91 teachers-only exhibition (16-19 January at London's Barbican).

You can contact the new company on the old Oak number, 0532-502615. Educationalists can call EMAP on 071-404 4844 for more details and free tickets to the BETT show.

TACTIC

Another winner from Systeme, the French games boutique. *Tactic* is nothing more than a *Klax* clone, but it's very tricky.

It has 200 or so levels (I'm told) but no-one I know has yet gone beyond the first seven without resorting to serious hacking. As you get passwords every eight levels, you have to start from scratch each time. A few more comments when I've managed to do a little better.

Tactic is on the Eterna label, but it's easiest to get hold of via Arxe Systems which is on 081-534 1198 (evenings only).

TECHIE TIP

One strictly for the programmers among you. I'm sure you know all about the system variables, things like Draw$Dir and Paint$Dir. The variables can be accessed by Obey files, and by application programs, and you can see all of them by typing `*Show` on the command line.

Most are simple numbers or bits of text (often pointing to files or directories), or macros. But did you know that there's a third type of system variable

A variable can point to a chunk of machine code that's executed every time you try to read the value of the variable. That's how Sys$Time and so on are done.

WINDING DOWN...

As we enter the nineties (How many letters from pedantic but wrong readers will that provoke?), it is clear that the Arc in its present form will not be the commercial success that the technology deserves.

But with over 100,000 machines out there now, it will become taken more seriously by games houses and application authors (and magazines!).

1991 should bring a number of major goodies too – an Archimedes portable, RISCOS version 3, the level 4 fileserver for Econet and, perhaps, cheaper ARM 3 machines. And there's the Active Book (so far, the prototype is more of an Active Briefcase), and maybe an ARM-powered portable from Apple too.

Nominees for the Stars of '90, *Impression 2* and *Orrery* and for the Follies, waiting for *Tempest*, and programs that use dialogue boxes which disappear unexpectedly (*Snippet* and *Artisan*, among others).

Ken Coumarin

PC

MIND YOUR LANGUAGE

Every now and then, when I can't get away fast enough, someone succeeds in asking me which programming language they should learn, as if they ought to be learning one and it matters which. OK, programming is fun; the pitting of the naked brain against purely intellectual problems. And for us amateur programmers it's best to keep regarding it as just that, an interesting hobby.

So, if you like puzzles by all means take up PC programming. Which language you choose depends at least in part on what kind of puzzles you like. For those who like seriously lumpy puzzles where you have to re-arrange lots of chunks then dBASE or one of its clones is the answer.

Of course, you may want absolute clarity as well, in which case go for COBOL which will give you the chance to write code like:

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A good COBOL program can read like a bad novel.

If you're interested in programming as a purely intellectual challenge then Pascal is the one, then you can sneer at those using tainted languages 'that just growed' – and worse, weren't designed by Niklaus Wirth. More sociable sorts, who just want to have fun, choose BASIC. You can always find a like minded friend. Those seeking ultimate control will choose assembler, and suffer for it. However, for those with poetry in their soul I recommend C. Lines like:

```
typedef void (far *
aardvark)();
```

or:

```
if((getit=fopen(argv[1],"r"))
==NULL) exit(1);
```

make the heart sing. Of course there's nothing quite like C for glamour. It is to programming what fighter planes are to aviation. When it flies it's elegant and powerful. When it doesn't the crash is fast and messy. And remember, nobody ever impressed girls hanging around in bars boasting that they're a Pascal programmer.

CHEAPER DTP

Desktop publishers who are a bit short of pennies are becoming spoiled for choice. Last year saw *Express Publisher* and *PageSetter*, both of which cost around £100 and offered superb functionality for the price. Now joining their ranks is *Avagio*. It's not new, but has been updated to run faster and the price has been slashed to £119.

Avagio appears to have some nice features; it uses scalable fonts and its own graphics format which allows scalable graphics without using PostScript. You can even convert PostScript graphics (in Adobe Illustrator format.) We'll be running a full review in a couple of weeks; if you don't have the patience for that ring the publisher, LTS, on 0386 792617.

POWER TO YOU ELBOW

From the same firm comes another interesting looking package, Publisher's Powerpack. This utility adds scalable fonts to Windows, Ventura, Word, WordPerfect and Works. The scalable fonts will print on dot-matrix or Hewlett-Packard lasers – and even Linotronic imagesetters – and offer a space saving alternative to soft fonts.

On Windows 3 systems the fonts even have an accurate on-screen version. A number of fonts are available, but the standard Powerpack comes with Times, Helvetica and Courier which can be used in any size from four point up to 1,000 point. It costs £79 from LTS.

SCREEN WORKS

• ScreenWorks: ***a library of icons for when you get bored with your DOS oval.***

SAVE ME

"Every user should have a screen saver to protect their monitor" says the press release. Well I'm not sure if I agree, having had some bad experiences with screen savers putting programs to sleep and the programs refusing to wake up again.

But I'm sure that *ScreenWorks* doesn't suffer from that problem, but I must say I'm more interested in the other part of the package; a library of icons for when the oval with DOS written in it becomes just too boring.

There are 70 icons to supplement the 'rotating fractal graphics' of the screen saver, and the lot can be purchased for just £24.95. The manufacturer: Software Toolworks. The phone number: 0444 831761.

STUNNING STUFF

I am pleased to report that the flow of games for the PC quickens by the week. The latest to drop on my desk for some serious software analysis is Tengen/Domark's *STUN Runner*.

Major plus points are that you get 5.25-inch and 3.5-inch disks, and it's pretty fast and difficult. The major minus points are the hideously coloured graphics, and it's pretty fast and difficult. And of course its the usual £20-plus which we are expected to pay these days.

In *STUN Runner* you control a sort of car – or is it a plane? – which careers down a toboggan run affair. You must bank up onto the sides to the run to gain speed while shooting other traffic and jumping over obstacles. It's fun to play on a fast machine, but as always slow PCs just aren't cut out for arcade action.

Stuart Anderton and Steve Patient

• STUN Runner: ***perhaps a little to fast and furious for a PC to handle?***

64

ESCAPE FROM
Colditz

• Banged up by Digital Magic Software - Gibson's Escape From Colditz.

TUNNEL VISION

I remember the days when I'd badger my brother and friends into playing *Escape From Colditz*. I didn't care which nationality I played so long as I didn't have to be the security officer.

The most incompetent opposition I ever faced allowed me to dig a tunnel under the chapel, steal the staff car, put something in the order of 270ft of rope to constructive use, make coat hangers out of the barbed wire and dig a second tunnel under the store room (twice). Most of all I remember that *Escape From Colditz* was a great game.

Gibson hasn't forgotten this either. After all, it was a Gibson game in the first place. Now, as you may have already read, the company has turned it into a computer game with the help of Digital Magic Software.

However, instead of going the way of other classic game conversions like *Risk* and, more recently, *Diplomacy*, the DMS Colditz game is constructed along the lines of an arcade adventure in which characters behave according to the limitations the board game rules used to impose on them.

This ambitious technique is obviously best suited to 16-bit machines and we have to acknowledge that it is the likes of the Amiga and ST that have allowed the project to get underway at all.

Nevertheless, the imminent 64 version will still consist of over 150 locations (more than the board game) and nobody has to play the security officer. The program does that. My money's on this being the best of the new year releases.

NO LANGUAGE PROBLEM

Replies have already come in to the *Express* office following our article a few weeks ago called, "All You Could Ever Want For Christmas." In it, one of the illustrious feature hacks neglected to mention that languages and utilities are available for the C64.

To most of you this is, of course, obvious. It certainly was to John M Hutcheon who said he had "pascal, cobol, fortran, logo, c, comal, ada (what do you do, John, work for the MOD?) as well as different formats of basic."

Mr Hutcheon, like many others, believes that if people who wanted this software could find it more easily, they would be less inclined to upgrade to those machines which are more commonly supported by such software. He's right.

LET YOUR 64 GROW

For those of you who may not have looked around before, there's a company called FSSL which really can supply everything the creative C64 user will ever need, from software to just good advice. FSSL is best known as being the exclusive distributors of Geos. Geos is an operating system environment which runs on PC compatibles but which was originally designed to provide a WIMP system for the 64 and is still used by many developers and programming hobbyists.

What's more, an increasing number of applications are still being added to the list of those integrated utilities available. There's even a magazine and disk series, *geoWorld*, devoted entirely to Geos users.

It's the nature of Geos that you can build on it in a modular fashion. Working from the Geos starter pack onwards, you can let your 64 grow tentacles in every direction and at any pace; *geoPaint*, for example, is supported by twelve volumes of good quality clip art, ready for you to include as letter heads, for example, in *geoWrite* and *geoPublish*.

These packages are all compatible with the Commodore 1351 mouse (or a joystick if you prefer). And there's more: file recovery programs, font construction kits, font collections, desktop games, PCB designers etc. You can even buy an extra 512K of RAM configured so that Geos can use it. Check it out.

Going back to languages, not only do FSSL have just about everything mentioned by Mr Hutcheon earlier, but the packages they offer sometimes include training packs, just in case it's the first time you've come across the language in question.

There's always been a good case for learning a computer language other than Basic. Programmers of C, Ada and Fortran command good salaries and are thin on the ground. Think about it. Times are getting harder and you've got this machine on your hands. It could be your meal ticket of the future. And teaching yourself almost anything is fun.

You can contact FSSL on (0386) 553153 or at Masons Ryde, Defford Road, Pershore, Worcs, WR10 1AZ.

Sean Masterson

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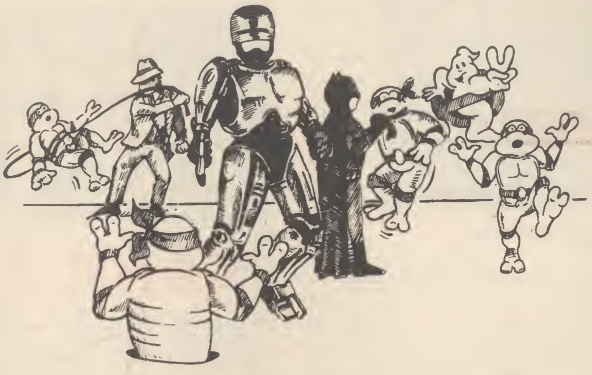

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Spectrum

MUSIC WRITER REVAMPED

There are now two new versions of Garry Rowlands' acclaimed music making utility *Music Writer*. From January 31 the old edition of this excellent package will be replaced by two new versions.

Firstly, there's *The Reference Edition* which is basically the old *Music Writer* with UTILITY.XTN, a previously separately available extension to the original, tacked on.

Then there's *The Muso's Edition*. This is the same as the reference edition but comes with a small instruction book rather than the usual hefty manual so musos knowledgeable with all those funny little blobs and lines that make up music notation don't have to pay for a manual telling them stuff they already know.

The abridged booklet means a saving of a tenner and the package sells for £15. *The Reference Edition* complete with mystic instruction tome is priced at £25. Very wisely, Garry's also making the manual available separately so musos can upgrade to it if they turn out to be a bit thicker than they thought.

Music Writer is available from a number of mail order retailers or direct from Garry Rowland at the above prices plus £2 for postage and packaging. Write to G Rowland, PO Box 49, Dagenham, RM9 5NY.

PRECISION ART

It seems like eons since the Spectrum last had a good art package so I'm glad to report the arrival of a new one: *Tech-Draw*.

It doesn't sound so much a straightforward arty farty program as a powerful no frills utility for drawing diagrams and anything else where precision is needed. I haven't seen it in action yet (please send a cassette version!) but the manual and accompanying bumph seem to suggest an altogether excellent piece of software.

The thing about *Tech Draw* is that it doesn't try to be a sexy looking art program but instead goes for a black and white display with an emphasis on speed and precision. Rather impressively it apparently lets you have two screens in memory at once. As it's completely pop-up menu driven, user friendliness should abound.

According the manual you can move the whole screen left or right and there are commands to draw circles, boxes, lines and arcs. I've seen some illustrations produced with *Tech Draw* and can confirm they're very good looking indeed.

Author G Hurst wrote the program to help in his career in oil rig design and it's been added to and customised over number of years.

I'm looking forward to seeing a review copy but in the meantime interested people have got no excuse for not trying it out anyway as a demo version called *Tech Demo*, is available for £2.99 (refunable if you upgrade to the full thing.)

This is an idea which the new software house behind Tech Draw plans to continue with all its future releases, so that there will be both a demo version and full version of each program available. Sounds like a very good idea to me.

Send an SAE for further details to Gordon Hurst and Associates, 86 Moor View Road, Sheffield S8 OHJ.

• *The inspiration behind* Tech Draw.

BUDGET HELECOPTER ACTION

There's a new budget rerelease that I must recommend. *Silkworm* picked up a bevy of acclaim when it was released a while back and now latecomers or just plain poor people can sample its multitude of delights for only £2.99.

Basically it's a horizontally scrolling blaster which sees you at he controls of a helicopter battling against the usual alien bad sorts. Completely unoriginal, but it draws on the good bits from predecessors to provide a very addictive playing experience.

Even the notoriously harsh Rich Pelley gave it a stonking 93 per cent in his *Your Sinclair* review.

IN CONTACT WITH COUPES

Here's another much deserved plug for Contact, the SAM Coupé user group which seems to have a high level of commitment to our blue footed chum.

It produces professional looking and interesting update sheets packed to the border with reviews, comment and news so exclusive even internationaly respected journos like myself haven't heard it!

It also runs a SAM PD library which had 12 disks of material at the last count. The christmas newsletter came with two free disks featuring some excellent demos, games and a clever competition involving sampled sounds.

All in all membership of Contact looks well worth while for SAM owners and it's great to see such a strong commitment to the machine despite its past difficulties.

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I couldn't find an address for Contact on any of the material they sent so send your SAEs for further details to me and I'll pass them on once communication is established.

By the way, I'm still interested in covering SAM stuff in the Spectrum column so all software, fanzines and details of user groups are welcome at the following address: Robin Alway. The Spectrum Column, *New Computer Express*, 30 Monmouth Street, Bath BA1 1EJ.

I look forward to receiving lots of SAM stuff soon.

COUPE EXCLUSIVE PUBLISHER

SAM software is still pretty thin on the ground, in the air and just-everywhere else for that matter which is why it's good to hear of a new publisher setting itself up to serve the demands of SAMsters.

GM Software was recently formed by an ex-MGT software man and has already got it's debut SAM offering out and waiting to be snapped up. It's called *GM Base* and is a fully intergrated database program which allows you to create, copy erase and rename databases as well as facilities to insert, search, sort and delete records.

GM Base is available on disk for 256k or 512k Coupés for a very reasonable £4.95.

The usual SAE to GM Software, 49 Main Road, Cryant, Neath SA10 8NP. will get you further details.

Robin Alway

ST

VIRUS KILLER LOOSE

MUG UK is about to release a commercial follow-up to the highly rated *PD Super Virus Killer*. Somewhat unimaginatively entitled *Professional Virus Killer*, it's to be distributed exclusively through Steve Delaney's excellent Floppyshop at an introductory price of £4.95.

Incidentally, Steve tells me that there's a rogue version1 of *PD Virus Killer*on the loose, about which he's naturally more than a little annoyed. He tells me it's a very buggy version which can in certain circumstances cause damage to your disks, so things can't be all bad. I hope it trashes your entire collection, you naughty pirate person you.

Details on *PD Virus Killer* and Floppyshop itself from Floppyshop ST, 45 Provost Graham Avenue, Hazlehead, Aberdeen AB1 8HB.

EXCUSE OF THE WEEK

A mysteriously Christian-nameless Mr M Curran of Tuffley in Gloucester writes to tell me of his experiences of buying an ST and discovering that his unit was one of those fitted with a faulty DMA chip.

(Remember this saga? The faulty chip can cause non-Atari produced hard drives to crash, even destroying data. Atari's line has been that it can only guarantee compatibility with its own over-priced hard drives, a statement which makes a mockery of any pretensions the ST may have to be a serious business machine.)

Anyway, Mr Curran quite rightly resented being blackmailed into buying an Atari hard drive and decided instead to phone Atari itself for information.

He spoke to an Adrian Transfield, who told him that Atari had been in touch with third party hard drive suppliers to discuss the problem. These third party manufacturers had said that they would be producing an interface so that the machines would work with their drives.

Fine, but if this is the case why have neither those manufacturers nor Atari itself informed the press of this fact? Surely this isn't another example of Atari's legendary stupidity and incompetence?

Anyway, Mr Transfield also told Mr Curran that the media had overstated the faults encountered and – get this, this really is a good one – that the supposedly faulty DMA chip fitted in Mr Curran's ST was not in fact faulty at all but simply "non-standard"!

Oh how I laughed!

By the way, is anyone interested in buying my old Metro? It won't go, of course, and it's only got one wheel. But it's not faulty. Oh dearie me no. It's simply, ahem, "non-standard."

DR T'S ANNOUNCE UPRGRADE

Music software specialists Dr T's and MCMXCIX (it's Latin you know) have released *KCS Omega* for the ST, featuring graphic note and song editing MPE modules based upon the highly-regarded Tiger technology.

According to Dr T's, the expanded capability of loading other ST programs, and support for up to 64 MIDI channels (with optional hardware), Omega should prove very attractive to MIDI users. It costs £299.

Existing users of *KCS*, *Level II* and *Realtime* can upgrade to Omega for a "very reasonable" (but unspecified) charge. Contact Abbey Rd-based MCMXCIX (it's Latin you know) on 081-963 0663.

BLOODWYCH CLUES

Bernie Culleton of Kilburn writes to ask whether I have any suggestions for Mirrorsoft's *Bloodwych*, "a damn fine game, as Agent Dale Cooper might put it, but not one I've so far had much success at."

Well, with the help of Henry Mueller's Adventurer's Club (for details of membership and so on, call 071-794 1261), I've come up with the following.

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but don't recruit them yet! Instead, recruit any others who wish to join you, take their food, then dismiss them.

If your backpacks become too full, leave any excess food at the regeneration room door (you will need to return there often).

As soon as possible, arm everyone with missile and vitality spells, and at least one person with a "levitate" spell. All enemies can be killed with missiles, and a "vitalize" spell covers everyone when food is low.

Never allow an enemy to face you. Draw him into a space that has at least one step in each direction, or a central pillar, then run around and kill him from behind.

It's a good idea too to have at least two save game disks, as some chambers need a certain key to get out of, and it's all too easy to get stuck with no way out.

Finally, always save your game before opening a gate or climbing stairs.

RE MORSE

A couple of weeks ago in this column I mentioned a new ST Morse code tutor, and wondered in passing whether Morse was still of any real use in this ultra-sophisticated era.

Well, Roy Gay, who works for British Telecom International at one of their Coast Radio Stations in Whitley Bay, writes to enlighten my ignorance.

"Although we are highly computerised and networked with other radio stations," writes Roy, "and in most cases newer forms of ship-shore comms have taken over, such as radiotelex and satellite, morse code communication is still a valid part of the job.

"We use it to communicate with ships – mainly Russian or Greek nationality – receiving messages such as when they are due to arrive at their next port of call and so on."

So now you know.

CHESS CHAMPION

Oxford Softworks' *Chess Champion 2175* is now the official World Personal Computer Blitz Chess Champion, having achieved this remarkable feat at the world Microcomputer Chess Championship in Lyon, France.

Blitz chess is like normal chess, I'm told, except if you're behind you're allowed to throw the pieces at your opponent... no? Oh, sorry, all the moves have to be played within ten minutes.

Oxford Softworks, situated not in Oxford at all but at Burford, is on 099382 3463.

CHEAP ADVENTURING

Virgin has taken over the distribution of Infocom's acclaimed range of adventures, and is releasing them in batches at just £9.99 a throw.

So if you're inclined to pick up any of these, get to it now: *Zork I*, *Leather Goddesses of Phobos*, *Planetfall*, *Wishbringer* and the classic *Hitchhikers Guide to the Galaxy*.

DATE FOR YOUR DIARY

Here's an entry for your new diaries. The next All Formats Computer Fair is at the inappropriately titled New Horticultural Hall in Westminster on 2 February, entry £3. Bargains galore, apparently.

NO TEARS, PLEASE

After a year and a half and something like 80,000 words, many of them well-chosen, this is my last ever ST column for *Express*. Before I go I'd like to thank everyone who has written or otherwise contributed to this ST forum, which I like to think has in some small way... (*get on with it – Ed*).

But I could hardly have picked a worse time to leave, just when things are about to get very interesting indeed. 1991 is, I'm sure, going to be Atari's most important year ever.

To be honest I've little evidence that the company can finally get things right – apart from an apparent determination at Atari headquaters to sort out the horrendous problems of the last 18 months or so.

Nonetheless, I'm prepared to bet that a year from now everyone will be more than a little surprised at how much has been achieved. The ST will have recovered much of the ground it has lost, so unnecessarily, to the Commodore Amiga games machine, and Atari will have patched up its various differences with distributors, retailers, developers, software houses, customers and (last and very much least) journalists.

If it doesn't, I'll eat Bob Gleadow's hat.

Over and out.

Steve Carey

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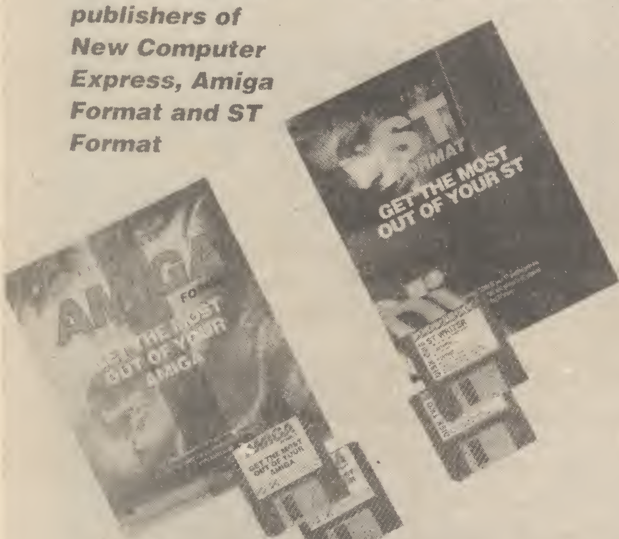

Two new brilliant books from the publishers of New Computer Express, Amiga Format and ST Format

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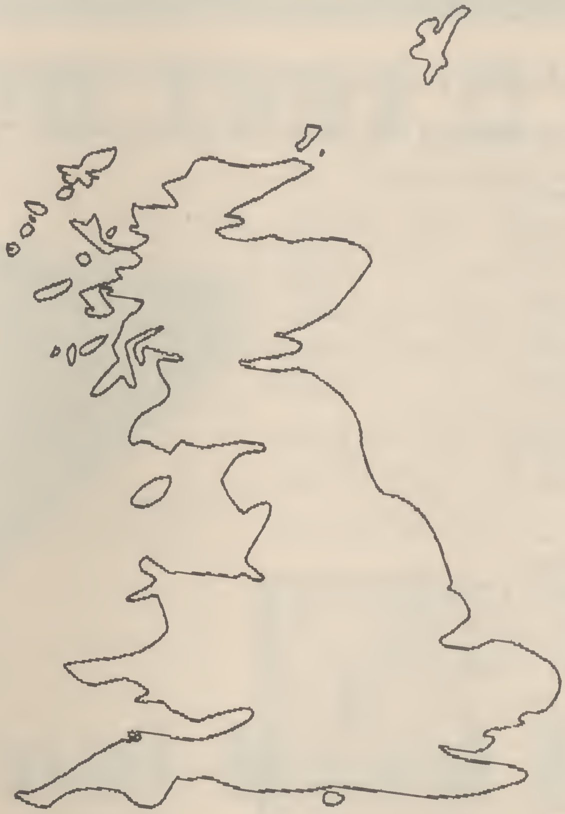

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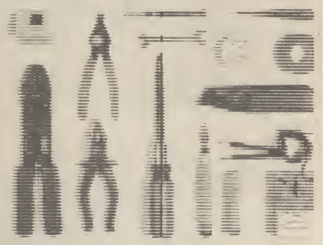
CIRCUIT CITY



If you've successfully built a couple of kit projects you're probably ready to graduate to the solder. Keith Pomfret takes a short cut and shows you how it's done.

The projects on offer in the '130 Electronic Projects Kit', featured in Circuit City (*Express* 111), were an interesting way to learn about electronics and how things work.

All of the projects on the kit were made from simple components available from any good electronics supplier, so we decided to grab a handful of resistors and other components and duplicate some of the simpler projects in the traditional way using solder and circuit board. The local Tandy store was able to provide enough resistors, capacitors and transistors to duplicate a project and a 30x25 hole circuit board was supplied to keep everything together

A good thing about duplicating one of the book projects on a circuit board is that you have a circuit diagram to follow, so you know which components to solder together, and the notes provided in the book explain a little about how the project works, what it does and how it can be modified.

The project I built for Circuit City is No14 in the book. This is a very simple circuit which causes rapid switching of a fixed LED display. It is described as a persistence of vision test. As well as demonstrating how you can pulse a circuit in a controlled manner, it shows how simple it is to create a circuit producing a burst of current which stops – even if the switch is held closed.

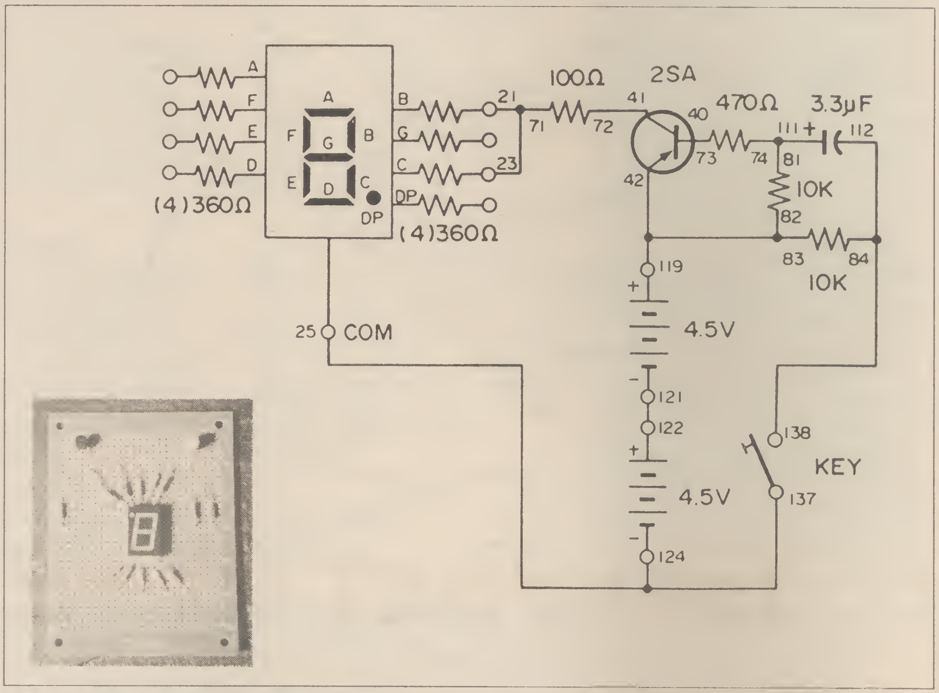
When you follow the path of digital circuits and interfaces involved in even the simplest computing you'll appreciate how useful this kind of control can be.

As it's a simple project, I didn't spend a lot of time working out the optimum positions on the board for each component. There were only a few components so I spread them out on the board, pushing the legs and wires of the components through the appropriate holes. Everyone has their own favourite way of working using circuit boards and I won't attempt to justify which way of attaching and soldering is best or worst. To make the job simple to illustrate, I have attached the components to the board with a blob of solder so they can be illustrated without the clutter of the wiring.

With the components thus attached, it's a simple matter of tracing the routes on the circuit diagram and making the connections using wire and a hot soldering iron. The wire should be pared and tinned (a thin coating of hot solder applied) before attachment. When wire and component are brought together under the heat of the iron, the solder should flow freely and make a good conducting join. If you're not an experienced solderer, it's an idea to keep the components on the board as far away from each other as possible. This way, if you're a bit over-generous with the hot solder, you won't end up with a river of solder joining the wrong terminals together.

It shouldn't take more than an hour or so from start to finish and when you've completed the circuit and connected the battery, you'll experience the thrill of scratching your head and wondering why it won't work.

Don't panic. It never works first time (if it did, enjoy it now – it'll never happen again). Go over the diagram and check the connections. When you've checked everything and found the fault, you've had your first lesson in practical troubleshooting too.



• *The circuit diagram and (inset) the completed board.*

There are another 129 projects in the book so you should have quite a bit to keep you going for some time.

TOOLS AND COMPONENTS

Soldering iron and solder (multicore)
Side cutters
8x360 ohm resistor
1x100 ohm resistor
2x10k ohm resistors
1x2SA transistor
1x3.3 mF capacitor
1x7 element LED display
Momentary switch
9v battery
All of the above components are available from Tandy, Maplin and hobbyists shops.

SAFETY FIRST

A soldering iron gets hotter than a branding iron so unless you want to be like prime beef on the hoof at the Bar B Q ranch, be careful. You could get seriously burned. Hot solder is difficult to get out of the carpet or the dog once it's cooled and it's got lead in it and lead's poisonous, so be careful what you do with it.

AN IDEA

If it's your first attempt at soldering and you're worried about damaging components or the board, here's a simple way to get a bit of practice without damaging your project. Buy the largest circuit board that you can afford and a big bag of cheap components. The small hobbyist component shops will usually do you a 'lucky bag' of bits that no one wants. With these, you can get practice at tidy soldering without putting your project at risk.

There are a number methods for removing erroneously soldered components. The first is to the heat it up with an iron and pull. This works but is liable to break wires and bend delicate components, as well as leaving messy corrosive solder on your iron. The second uses desoldering braid which is a sort of blotting paper for solder and soaks up the hot solder as you warm it. Third and most elegant is the vacuum solder pump or 'solder sucker'. This hoovers up the solder and leaves the cleanest result. Braid and pump are available from most hobbyist shops, Tandy, Maplin, Harrods, etc.

CIRCUIT CITY CHALLENGE

So you think that you can do better, huh? So put your soldering iron where your mouth is (did that hurt?). The best home grown circuit/project of the year will be rewarded with a prize of at least £1,000 worth of hardware. To be eligible, the entry must arrive at *Express* in working order. It must have instructions on what it is and what it does. The project must be useful, original and stand alone (it mustn't be a peripheral). Photographs of the build process, legible circuit diagrams and full instructions must be included. ■

The 130-in-one Electronic Lab costs £29.95 and is available from Tandy.

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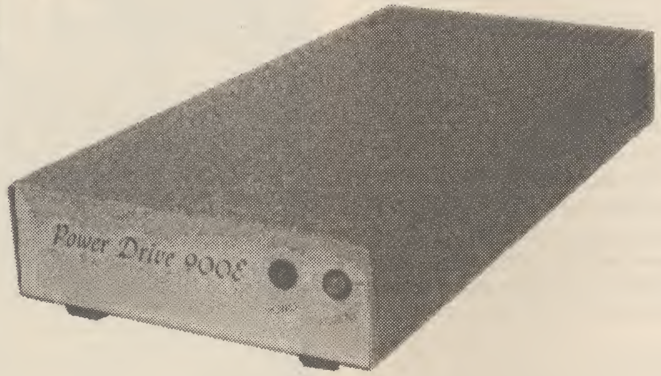

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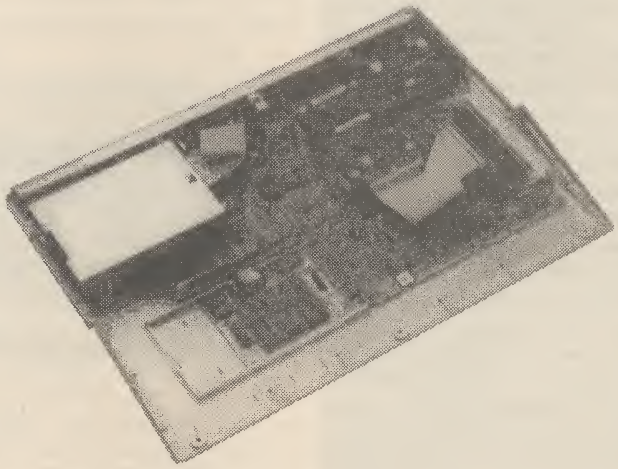

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OPENING TIME

Damn! Blast! and Damnation! Plugs, batteries and fuses. Why is it, that in one of Europe's most advanced countries, when you go into a shop and fork out copious amounts of dosh for a new piece of consumer electronics, you always find that there is no plug?

What's worse is that you bought the kit on a Saturday and the shops won't be open until Monday when you can't go because you're too busy. Why no plug?

The only option is to cannibalise the Magimix; only to discover that "If the user is interfacing the system AC-wise with a 13amp plug unit, a 3-amp fuse must be used otherwise you'll screw-up the entire street." Who keeps 3-amp fuses lying around the house? So you're left with no MagiMix and no new gadget. The final straw is that you are told – at the back of the Japanese, German, Italian, French, Swahili, Croatian and American English manual – that the "built-in clock timer and memory back-up system requires 23 HP3 batteries. Not included" NOT INCLUDED! Do these people want to sell machines?

So my New Year's resolution is to hammer-lock showroom salespeople until they give me a free plug, fuse and enough HP-bloody-3 batteries to keep Wembley stadium floodlit throughout the season.

New Year's resolutions. There's a thought to turn the stomach of even the strongest among us. It always seems that NYRs take the form of giving something or other up. Why should this be the case?

What would have happened if Albert Einstein had woken up one January 1st with a stonking hangover and said: "Dot's it. I giff up teeorizing about ze universe frrrom now on in!" Disaster. A million physics students would be posterless.

What would the world be like had Alan Turing staggered back from the Bletchley Logarithm Arms and, leaning against a lampost, had said: "That's it, I give up playing with figures and trying to invent the computer as we will know it in the future." Catastrophe that's what.

Picture the scene of a weary Alan Sugar, bumbling around the East End of London on a cold morning at the beginning of 1963. "Have you made your New Year's resolution yet young Alan?" Says Mrs Sugar. "Yes mum", comes the reply, "I've decided to give up the world of commerce and join the Royal Ballet." Doesn't bear thinking about does it?

So it's time to change the way we think about NYRs. To start this new tradition here are a few of mine.

I will take up using Unix-based workstations as soon as some kind soul donates one to me.

I will take up programming in 6502 code for whoever wants to commission me at extortionate rates of pay.

I will take up not slamming my fist into Mac Pluses when they screw up by nat soving taxt proper

Tim Smith's

CEN

Write to 30 Monmouth Street, Bath BA1 2BW (nice logos aren't they?)

LETTER SPRAY

Let's do it, let's correspond. Letters are such a delicious way of keeping in touch. So what not drop us a line about anything which comes to mind, as long as there is at least one computer reference. We begin 1991 with this rather fraught missive.

Dear Mr Smith

In the 15 December issue of *New Computer Express* you implied that programming in RISC code was not fun. I completely disagree with this. Although I have not programmed in RISC code I have written code in 6502 and Z80 assembly. The former language is very straightforward. The latter is full of rules and exceptions, making it very irritating to program in. Even Z88 Z80 assembler cannot find some of my syntax errors. I expect a full correction and apology for your ridiculous remarks to be made promptly in your pages.

Yours sincerely, Thomas Hawtin, Totnes

Dear Thomas,

Woow there big fella. Let me get one thing straight here, you have never programmed in RISC code yet you have taken a simple little frippery as a deeply wounding personal remark. Whacko.

If you fancy hanging around until the world downhill speed skiing championships take place in the Negev desert then you might get an apology. Until then watch it with words like 'ridiculous' and 'correction'. If you were to question 100 people on the average High Street I am sure you would find that 98 of them would agree with me. Oh, and by the way, thanks for addressing me by the correct title.

Dear Tim,

I would just like to say how much I appreciate the Centrefold as a pleasantly light interlude amidst the high-tech subject matter of *New Computer Express.* I wonder if you have considered setting a short story competition about computers?

Yours, Roger Gillis, Kircaldy, Fife

Dear Roger,

No. The thought has never crossed my mind. Maybe if other readers think it's a good idea they could write in and you could judge the competition.

DESPATCHES

"The more foreigners I saw, the more I loved my homeland" So said P L B Du Belloy in Le Seige de Calais (1765). He would never have made a Centrefold Despatches reporter. These people love to be abroad, and they adore telling us what's going on. This week it's Lewis Lewis from Lladosfewedelli in Wales.

43MHz. That's right, Red Dragon labs has finally developed a fully configured home IBM compatible PC which runs at an incredible 43MHz per hour. The ReDragon PC comes with 640K RAM as standard, a 20Mb hard drive and cable to fit it to your serial port. Visuals are supplied by a Super-MDA mono monitor. Aside from the hard drive there are twin 5.25-inch floppy, 1.2Mb drives, a 20 disk plastic case with its own lock, and a small holster for the mouse.

The PC comes with seven ports: five parallel/Centronics, one mouse port and the serial port which takes the hard drive. Optional extras include MS-DOS 1.2. Optional, optional extras are GFA BASIC version 1.1, *FirstCalc* and *Space Invaders*.

Another advance, this time from Jones the Computer Inc is a completely intelligent modem. The Winnet V23 comes with 200 programmable preset numbers which can be written on a small pad of Post-It notes affixed to the top of the system. Several protocols are supported, such as the all new V22.5. The system is set to retail at £250 and will ship in the spring.

By the way, I managed to pop up to North Wales, well just outside Conway to be quite honest, where your friend and mine Huw Pugh has nearly finished writing his Amiga version of *Under Milk Wood* – the adventure. You get to play the blind Captain Cat who chases around Llareggub in search of several alarm clocks. It looks like being a real JPR of a game and no mistake. The only problems at the moment are that it is text only and requires the user to be blind drunk and abusive to play it.

Cheers for now then, and I'll see you at the Arms Park. Please send the money urgently as I want to invest in yet another Government Enterprise scheme.

T-O-SH 20

What was happening a year ago in computing? Whatever it was, *Express* was there to cover it. So read on to find out.

INTO THE ASHES

Firebird, the software label responsible for such wonders as the classic *Elite*, as well as *Bubble Bobble*, *Rick Dangerous* and *Sentinel* was all but abandoned by parent company, MicroProse. A spokesman for MicroProse told *Express*: "Firebird tended to be regarded as a bit of a budget label, so we've decided to drastically reduce the number of games released under it. If something doesn't really make the grade on one of (MicroProse's) other labels we might consider releasing it on *Firebird*, but for the moment it's dormant."

NO UPGRADES

As the story read that week: "Owners of Amstrad CPC646 machines hoping to upgrade to a 6128 have been blocked by Amstrad and Locomotive Software."

Previously, owners of the 464 had been able to buy a ROM chip from Amstrad's returns department in order to upgrade. However, Locomotive who wrote the BASIC operating system was getting a little peed off about not receiving any royalties for this. It went out and blocked sales until a "suitable royalty agreement" could be reached.

OLIVETTI IN MISTAKES TRAGEDY

The troubled Italian firm admitted that it had been losing out on the blood-thirsty but lucrative home PC market. It also admitted that it would be laying off some 500 workers Europe-wide. Boss man Vittorio Cassoni claimed that this restructuring would make 1990 a better year.... well now.

STE – AMED UP

Many of the best selling games of 1989 were found not to run on the STE. *Populous*, *Stunt Car Racer* and *Rick Dangerous* simply did not want to come out and play on the new ST.

NTREFOLD

IN DEVELOPMENT

Every week we bring you news from the edge which is so cutting it makes Oscar Wilde's wit sound like Jim Davidson. IN Development shows you what might be in the shops by 2033. This week our technology correspondent Ed Ruin tells us of an Israeli party emulator-board for the Atari STFM.

CONCEPT

The concept for what could become an essential piece of 21st Century hardware came from the laboratories of the Rosenthal Corp based in Haifa. Dr Emanuel Rosenthal had spent many, years developing hardware for home computers – such as the legendary 1,232K memory expansion box for the Oric Atmos – that he never had the chance to go out and party. Being a man of good humour and immense capacity, he decided to provide personkind with an easy to use party emulator. The ideal design according to the doctor is to have a background system which can be activated at the flick of a switch and will not interfere with normal working practices.

MODUS OPERANDI

The basic system consists of a 12-inch by 4-inch by 2-inch box which fits into the cartridge port on the side of a standard STFM. The box contains the circuit board, party hats, booze, cakes and pass-the-parcel parcels which are essential for a good time. The box requires a separate power supply in order to keep the sound system and lighting rig going. The supply converts normal 240v signal into the required 2,000 volts.

In use, the PartyAdd, simply plugs in and becomes active when a small button, or optional foot pedal, is pressed. At this time the screen of the STFM displays a image of your ideal party-ner while music such as *The Birdie Song, Hi-Ho Silver Lining, If I Were a Rich Man*, and *Shout* is played. The tunes are optional and have been recorded digitally using 32-bit sampling technology, a full orchestra and laser mastering. There are fears that they might last for thousands of years. Several events can be pre-programmed by the user; these include: kitchen heart-to-heart simulation with full drunken tears, people copulating beneath coats on spare bedroom shoot-'em-up, and visits from the police adventure game. A boss-button is also planned which sets fire to the boss if he or she comes within 200 metres without a bottle of cheap white wine.

REQUIREMENTS

The user will be required to own an Atari STFM, have an excellent sense of humour, and a strong stomach. Booze, light and party-ner upgrades are planned for release by a major UK software house whose name might rhyme with Potion, but that's so secret that not even they know about it yet.

PRICE

Price is fixed at £1,200 with each add-on and upgrade coming in at £240 (to undercut Neo-Geo games).

RELEASE DATE

Release date is windowed in Israel in June 2022. America is May 2022. Japan is December 2055 and the UK is March 2099.

I WISH I'D SAID THAT

The day that the human race decided to build the Tower of Babel and God took umbridge saw words becoming little demons. Have you heard or read anything computer related which made you fall about with glee or gasp in astonishment? Well send them in to IWIST as soon as you can.

"You can't go wrong in purchasing the item you were waiting for. If you don't like it, send it back. If you do, keep it and the chances are that your productivity will increase manyfold while you would be supporting the vendors in the Amiga community." Frank Khulusi – and his wife - of Creative Computers in the USA.

NEW TV CHANNEL FOR COMPUTERS

A CENTREFOLD EXCLUSIVE

Since the demise of BSB and the realisation that the Astra satellite will broadcast just about anyone who has the dosh to spend, we at the Centrefold have decided to launch CDTV (Centrefold Direct Television). This is not a cash in on any product of the same acronym. It is a valid attempt to provide the computer user with the best in microchip related TV. Here is the first Monday's viewing:

5:30 AM *Wake Up You Lazy Bunch of B*****s* (aerobics with the Puce Demi-Goddess, star interviews with Ange Emerald and Eamonn Smoothy, cartoons for the kids and much more)

6:15 AM *Tron* (a wild film extravaganza from Disney featuring a computer with a man in it)

8:30 AM *2001* (a wild movie extravaganza featuring a space ship with a computer in it)

11:00 AM *Desert Island Disks* (hosted by Tim Smith. Every week a famous celebrity is quizzed on their top nine pieces of software. This week, Robert De Niro's baggage handler)

1:00 PM *Jack-a-Network* (Today Bernard Cribbins tells the story of the LAN which wouldn't behave.)

2:00 PM *A Question of Sort* (Two teams of computer celebrities compete for the prized Silver Dongle in this fast and furious quiz about database sorting techniques.)

3:20 PM *Herbie Rides Again* (a cinematic extravaganza about a Volkswagen with fuzzy logic)

5:15 PM *News* (What's happening in computing? Angela Rippon's legs semaphore the lastest news)

7:00 PM *FILM PREMIER War Games* (For the first time on CDTV this celluloid extravaganza explores what might happen if a precocious kid was to get hold of a computer, a modem and an unlimited telephone bill)

9:30 PM *Weather* (Find out whether you should leave your PC in the garden overnight with Michael Fish's cousin's friend's hairdresser's char lady)

11:00 PM *Thought for the Day* (See Tim Smith attempting cogent thought – this program may begin at 11:40 depending on last orders and taxis)

12:00 PM *Close down* (The end of viewing until tommorrow).

That's it then folks. If you would like a CDTV dish and decoder simply write to me at the usual address and include cash to the value of £12,000.

T-⊕-SH 40

It's a well known fact that lists are one of the easiest ways to absorb useful information. Writing facts and figures down in easy-to-handle chunks is a method by which we humans can digest them. So it's a pity that this excellent form of aide memoire should be abused in the Centrefold. Read on for more useless rubbish. Hey, but remember it's value for money useless rubbish.

TEN THINGS TO DO WITH A QWERTY KEYBOARD

1) Use the keys as jewellery
2) Batter an estate agent for charity
3) Give it to a dyslexic and tell them it's a novel
4) Remove the letter L to foil Welsh town planners
5) Grate very crumbly cheese with it
6) Super Glue the keys for fun with a speed typist
7) Use it as a cricket bat
8) Put it down the back of your trousers when a canning is imminent.
9) Write a best-selling book and sell it for £3 million
10) Attach it to a Megadrive and sell it to IBM for $33 million

TEN THINGS WHICH COMPUTERS ARE UTTERLY USELESS AT

1) Crossing roads
2) Making coffee that tastes like coffee
3) Nights of passionate love making
4) Giving birth
5) Swimming
6) Flying aircraft
7) Witty after-dinner conversation
8) Witty pre-dinner conversation
9) Eating
10) Being able to take the initiative

TEN THINGS WHICH COMPUTERS ARE UTTERLY BRILLIANT AT

1) Adding up
2) Dividing
3) Multiplication
4) Long division
5) Crashing
6) Attaching peripherals to
7) Putting disks into
8) Running spreadsheets on
9) Sitting still, looking like a computer
10) Slowly taking over the world while no one is looking

TEN FAMOUS ANAGRAMS

1) Commodore = Coor Do Me
2) Amstrad = Mad Rats
3) Apple Macintosh = Help Stop Maniac
4) US Gold = Do Slug
5) Bitmap Bros = Rabbit Mops
6) Alan Sugar = A Gal Ran Us
7) Atari = Al Rat
8) MicroProse = Poor Crimes
9) Electronic Arts = I Snort EC Claret
10) Game Boy = O Gay MBE

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ZENITH FILLS HDTV BREACH

A sad consequence of the recent merger of Sky TV with BSB is that TV viewers won't be able to experience high-definition television, and will have to rely instead on 625-line PAL TV as we already have in the UK.

This situation could change as Zenith and AT&T have revealed they are developing an all-digital high-definition television system that will solve many of the problems of marrying the audio signal to the TV signal of competing HDTV systems.

Eighteen months in development, the Zenith–AT&T HDTV system incorporates techniques based on AT&T's research in digital video and audio compression.

Zenith will be responsible for the system definition and transmission technology, while AT&T will handle the design and implementation of a new video compression system. AT&T's microelectronics division will be responsible for the semi-conductor technology.

The Zenith–AT&T HDTV system transmits 1,575 horizontal picture lines compared with competing systems based on 1,125 or 1,050 lines. The pictures on existing televisions use 625 lines, although several of these are used for alternative purposes such as controlling the picture and provision for teletext signals.

But when will we see the Zenith/AT&T system in use? The Federal Communications Commission (FCC) in the US will make a decision on the final winner in 1993, by which time the battle – in equipment terms – is likely to have been won.

ATARI VS THE FCC

Atari seems to be hitting problems with the FCC, the body that decides whether a product is electrically suitable for sale in the US.

The FCC has allocated a Class A commercial tag to the TT series. This is the same classification that the Stacy was allocated in early 1989, which has prevented it going on widespread sale in the US.

Home computer manufacturers tend to look for an FCC Class B consumer tag on their machines, so that the units can be sold for use in the home. Strictly speaking a Class A tag means the machine can only be used in an office or factory environment.

In practice most users don't give a damn what classification a machine is given. The FCC does, however, and word is that the US Government department is getting tough on dealers who sell Class A units for uses other than those specified.

Where does this leave Atari? The good news is that the Mega STE and STE series – formally unveiled at Comdex Fall last November – have achieved Class B acceptance meaning they can go on sale in the US.

In the short term, the FCC classifications on the TT series will mean that more machines will be sold in Europe than in the US. Longer term... well, look how many Stacys are being produced for sale generally.

ST BUG NEARS BUSTING

Ron Kovacs' *Z-Net* newsletter reports that the SPC (show, print, cancel) bug in TOS 1.6 for the Atari ST is very close to being tracked down and solved.

The bug, which manifests itself with TOS viewing rather than loading an executable program on the ST, seems to occur a lot more frequently when the entire line – including path identifier – totals 16 characters in length.

Atari's programmers are reportedly hot on the heels of the bug. In the meantime, if the bug causes ST users problems, Atari recommends they rename files to avoid the 16 character name and directory problem triggering the bug.

COLOUR PUBLISHER FOR MAC

Astral Development has released a colour version of its *Picture Publisher* package for the Apple Macintosh. As well as giving Mac users access to colour editing facilities on the Mac, the $695 package features built-in calibration as well.

The calibration facility can be used to compensate for variances and inconsistencies of scanners and other input devices. Consequently, almost perfect pictures can be turned into perfect ones using the software equivalent of an airbrush, the company claims.

For further information write to the company at Astral Development, Londonderry Square, Suite 112, Londonderry, NH 03053, United States. Telephone 0101-603-432-6800 or fax 0101-603-434-6904

1040STE PRICE REDUCTIONS

Now here's an interesting fact – Atari Canada has slashed the price of the 1040STE from Can$999 to just Can$699, meaning the machine will set you back around the £350 mark in sterling terms.

Why the price cut? Atari Canada isn't saying, but I reckon that the Mega STE series might – just might – mean that the 1040STE machines will be phased out sometime in 1991.

Canada is well-known for its computer marketplace being a small-scale version of other markets. Amstrad has unveiled versions of its new PCs there in the past, while other manufacturers have used Canada as a proving ground to see how the market develops. It appears Atari is following this trend.

DENNIS HAYES GETS FIVE YEARS

Not the Dennis Hayes behind the famous modems. This one has pleaded guilty to selling more than 5,000 Apple Mac ROMs – primarily to Amiga and ST owners who used them with the Mac emulation cartridges – over the past few years.

Hayes was sentenced to five years in clink just before Christmas for his actions. As I said before, this signals a price rise in the cost of a set of Mac ROMs for the Mac emulation cartridges – assuming you can get hold of the chips in the first place. ■

AMIGA BOOT-UP REVEALED

Many Amiga users will probably be unaware of the complexity of the checks that the Amiga carries out on itself when it boots up. The flashing of the caps lock key is only the tip of the iceberg, according to the *Ami Today* on-line newsletter.

Thanks to *Ami Today* and several other on-line sources, here's what actually happens:

(1) Clear all old data in RAM
(2) Disable DMA and interrupts
(3) Clear the screen
(4) Check hardware (is the 680x0 working?)
(5) Change screen colour indicating pass/fail
(6) Perform checksum test of all ROMs
(7) Change screen colour indicating pass/fail
(8) Begin system startup
(9) Check RAM at $C0000...move SYSBASE there
(10) Test chip RAM
(11) Change screen colour indicating pass/fail
(12) Check if software is coming in OK
(13) Change screen colour indicating pass/fail
(14) Set up chip RAM to receive data
(15) Link libraries
(16) Check for any additional RAM and link it
(17) Turn on DMA and interrupts
(18) Start default task
(19) Check processor and MMU type
(20) Check for an Exception (processor error)
(21) If found, do a reset
(22) If not, normal 'boot'

While all these tests are running, the caps lock key will normally flash once, while the the screen will cycle through colours. The following chart used in conjunction with the above steps indicates both a 'normal' and an 'abnormal' boot.

NORMAL SCREEN COLOUR	ACTUAL COLOUR
Dark Grey	Red – indicates error in ROM
Light Grey	Green – error in chip RAM
White	Blue – error in a Custom Chip
	Yellow – 680x0 found an error

IF CAPS LOCK STAYS ON:

One flash – ROM checksum failed
Two flashes – RAM test failed
Three flashes – Watchdog timer
Four flashes – The circuits are shorting

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12 Months On Site Warranty, featuring 24 hour response time is available as an option on all ST's for just £29.99 extra.

Please Read: Terms of Sale.

We are the longest established Atari dealer in the U.K. We have developed an extensive customer service policy which means that we test all Hardware/Software prior to despatch to ensure that goods arrive in working order. Although our prices are not always the cheapest we do endeavour to offer consistently good service and backup. This isn't just our opinion, we were voted "Best Dealer 1989" by the readers of ST World magazine, not for "the number of boxes shifted", but for quality service.

On Site Warranty: We have recently changed our backup programme by offering 12 months on site warranty as an extra with all ST's therefore giving the customer a wider range of options. We already offer on site warranty on all Star printers and Philips monitors listed at no extra charge.

All prices are correct at copy date 03/01/91, and are subject to change without prior notice. All prices are accurate while stocks last. Phone for up to date prices. All prices include VAT, there are no hidden extras (WYSIWYG). Delivery (in Mainland U.K) is free, on orders over £100 (add £10 for next day courier delivery. All prices available on Mail Order. Shop prices may differ.

Atari Packs

520STFM Discovery Pack	£ 279.99
520STE Turbo Pack	£ 369.99
1Mb STE Turbo Pack	£ 399.99
2Mb STE Turbo Pack	£ 474.99
4Mb STE Turbo Pack	£ 549.99
Plus pack: ten games, J/stick, Dustcover	£ 30
Lynx + California games	£ 129.99
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Amiga Packs

A500 Batman Pack	£369.99
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Plus pack	£30

Includes Tenstar, Photon paint II, joystick, mouse mat

Service Centre

Diagnostic service £15

Our Engineers can repair ST's and Amiga's in minimum time at competetive rates. We also offer a diagnostic service for which the customer is given a quote for the total cost of repairing the machine.

ROM switch + TOS 1.4 £49.99

This switch allows two sets of ST ROM's to be fitted to an ST and switched between to ensure compatability with all software. Machines must have TOS 1.09 in two ROM form. If six sockets are fitted, no soldering is required. TOS 1.4 (2 ROM's) and two extra sockets are supplied.

Exchange ST PSU's £59.99

We can offer fully compatible PSU's for ST's at this price in exchange for the damaged PSU. Our engineers can fit any STFM memory upgrades for £20. We can also fit SIMM's, TOS, Blitter chips, PSU's for just £10. Phone for details.

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Cmdr 1084S Colour monitor * limited offer *	£ 269.99
Philips 15" FST TV	£ 269.99

The philips 15" FST Tv includes: remote control, Scart input, 60 tuner presets, sleep timer and Fastext. All displays include Scart cable. Deduct £10 from Monitors only, if bought with computer. The Philips 8833 comes with full 12 months on site warranty.

Trust PC's

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New Prices

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Public domain software is yours for the mere price of a disk. Adam Waring casts a critical eye over the latest programs available including a taste of virtual reality, a Breakout for the Nineties and an ST version of a classic board game.

Virtually Real Preview • ST • South West Software Library • Disk 1351

It's weird, this virtual reality business. You don't know whether you're coming or going half the time. It's all about moving through cyberspace, an artificial environment that's so realistic you feel like you are actually there.

The first virtual reality machines are now virtually a reality themselves – if you have a few hundred thousand pounds to spare. But now you can take a stroll down cyberspace lane on the cheap, with this demo version of a demo.

It's not totally finished yet, but has been released as a preview of the real thing. At the moment it's very short, lasting not more than 10 seconds, but it's enough to show what the system is capable of doing.

So how do you simulate this realistic world on the screen of your Atari ST? Well, cast your mind back to those 3D cinema epics of the Fifties, where the entire audience donned those daft red-tint-in-one-eye-and-blue-in-the-other spectacles.

Well you have to wear them to make this program work as well. They are used to create the three dimensional effects providing the 'virtual reality' aspect of the program. The graphics are drawn twice in different colours. One set is filtered out by the red lens, the other by the blue. So what you see through the glasses is a slightly different image for each eye.

By varying the distance between the two images, a sense of depth is created. The image is projected either 'in front of' or 'behind' the screen, depending on which side the coloured lines are.

The illusion is one of travelling through a strange alien landscape. You move rapidly through a valley floor between rocky mountains. Without specs it's a vague mess. Put on a pair of the magic glasses though, and the full 3D effect comes to life.

Where, you may well ask, do you get hold of a pair of these miracle magnifiers? Well, BBC1 staged a 3D broadcast a few years back, and gave away a free pair of the glasses in the *Radio Times*. If you've ever been to see one of these 3D spectaculars at the cinema then doubtless you'd have taken the glasses back home with you.

In the event that you're right out of 3D glasses, then The South West Software Library can supply you with a kit to make two pairs for a quid.

The *Virtually Real Preview* is certainly a novelty, and I'm looking forward to seeing the finished version when it becomes available. You'll need at least a meg to run it and a colour monitor.

A word of warning, though: don't wear the glasses for too long – you'll end up looking like a cyberman.

Scrabble • ST • South West Software Library • Disk 1353

Scrabble is a word game that's been around for years. But in case you've been on holiday in a small isolated igloo in Lapland for the past 50 years, I'll give a quick run down of the rules.

It's a sort of crossword game, the difference being that there are no questions or clues. Instead the crossword is constructed by the players using special tiles.

Each player has a rack of seven tiles. On each tile there is a letter. The players take it in turn to make words from the letters, making sure they join on to the existing letters on the board to form legitimate words. The letters have different scores allocated to them depending on how common the letter is. Therefore an 'E' scores far less than a letter like 'X'.

The board has various multipliers, increasing the score of letters or words laid on the board. Strategic placing of the words is necessary to achieve the highest possible scores.

The computer version does everything that the board game does, and much more. For a start, there's no need for pencil and paper to tot up the scores as the computer automatically keeps a tally as you go along.

Stuck for someone to play against? The computer has been 'taught' to play, and the variety of difficulty levels mean

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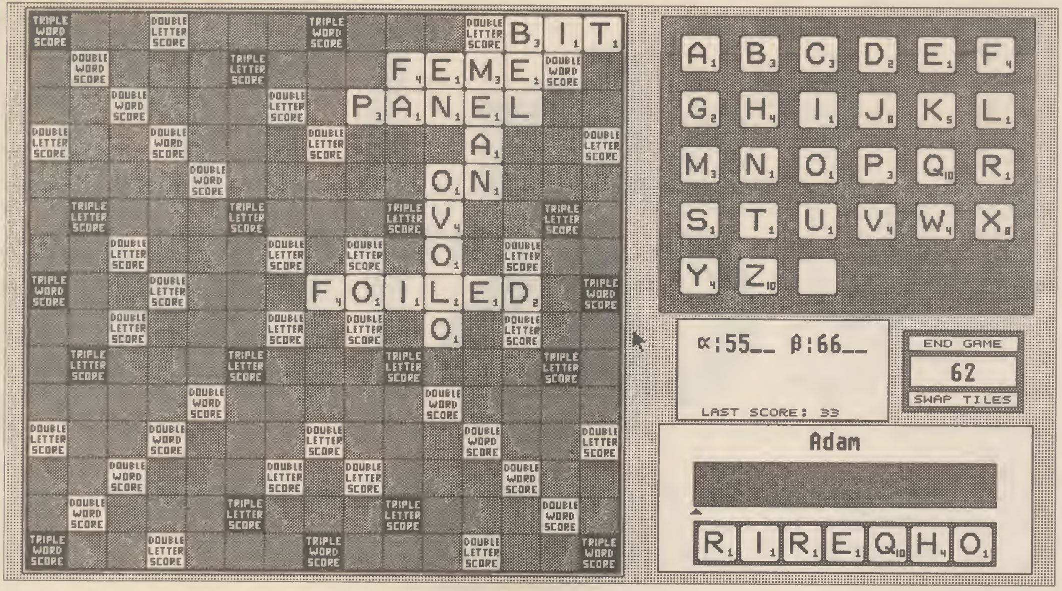

• **Scrabble:** *You can play against the computer but be warned – it's got an infallible memory.*

that it'll give even the most accomplished player some stiff competition. The computer's response time is very fast, thinking up the thousands of combinations of words in seconds.

The game has a built in dictionary which the computer uses to store its vast vocabulary. Players are allowed access it as well, so you can scan through for words to match your letters. I'm sure that's cheating, but if you can get away with it...

You'll need a megabyte to run *Scrabble*, and interestingly a mono monitor. It's a pity because the majority of people who own colour machine will be unable to play.

Bolo • ST • Gemini Shareware • ST-151
Bat and ball games were the ones that started it all. First there was *Pong*, where you wacked the ball to and fro between a couple of players. It was followed a couple of years later by *Breakout*, which was slightly more complex, with a wall full of bricks to demolish.

Now there's *Bolo* which takes *Breakout* into the Nineties, with lots of features, pretty graphics, and some nice effects.

Each of the 50 screens is made up from a variety of patterns. The blocks which make up these patterns have plenty of features too. Some need to be hit several times; others explode on contact with the ball, showering shrapnel all over the screen. If some hits you then you're a life down.

The bat isn't restricted to left and right movements. You can move all over the screen, so if you're concentrating on a certain area, then you can knock down the bricks with ease.

Despite being in black and white *Bolo* is one of the prettiest games you're likely to see on the ST, working on both mono and colour monitors. ■

WHERE TO GO

GEMINI SHAREWHERE, 10 Warwick Avenue, Slough, Berkshire SE2 1DX. Tel 0753 28183.

This library supports the ST, Amiga, PC and Mac. What a gem! It is, in fact, a British subsidiary of a large American corporation. Prices go like this: ST and Amiga £2; PC £2.75; Mac £4. You'll have to add VAT to these prices, but note that the cost gets cheaper the more disks you order.

SOUTH WEST SOFTWARE LIBRARY, PO Box 562, Winbourne, Dorset, BH21 2YD.

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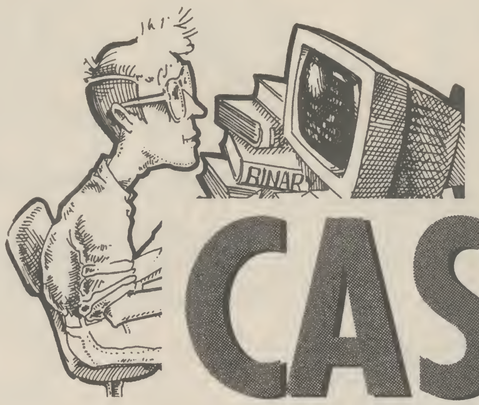

TYPE CASTING

Now you know how to program, the next step is understanding the best way for storing data. Mary Branscombe shows you how.

The information that your program has to deal with can be very complex and it must be represented by data that the computer can handle. Information can be stored in variables or constants, or in more complex objects known as data structures. Although every item of data is ultimately stored in the same way, the different data types available can be used to organise your program and distinguish different classes of information. To choose the best data structure to hold your information and to use the power of data structures to the full, you need to understand how the machine sees the data it processes and how data can be classified.

WHAT IS DATA?

Like the actual program itself, data is stored by the computer as a pattern of two voltage levels, usually represented by the symbols 1 and 0. Each position in the pattern can hold one of the two values, known as a binary digit or bit; the patterns of values are bit strings.

A single bit can represent the two states of the voltage level, or anything else that has only two states. To represent more states, more bits are required. Two bits can represent four states, three bits can represent eight, six bits can represent 64 states and eight bits, which form a byte, can represent 256 states. The different states are allocated to the combinations of 1 and 0, so that the four states represented by two bits are coded by the patterns 00, 01, 10 and 11.

These bit streams are often used to represent integers, which then represent data. The pattern can be treated as a binary number, with the positions, from the right, representing 1, 2, 4, 8, 16, etc, and this is the most common system, but Binary Coded Decimal (BCD) can also be used, where the positions in the pattern represent 1,2,4,8,10,20, etc. Negative integers can be represented using twos complement, where the highest value of the bit string is treated as a negative value and subtracted from the other, positive, values.

Different data types are distinguished by their headers – coded information that represents the type of the data and how much memory it occupies. Data needs to be classified into types so that it can be evaluated and used correctly and different types of data need to be distinguished, so that you do not attempt to add a number to a Boolean truth value, for example.

LAZY LANGUAGES

This division of types also allows the implementation of the language to be simpler; the range of functions that can be used with each data type is reduced, so that you cannot add together Boolean values or the ASCII codes for characters, which would result in nonsense. Strongly typed languages such as Modula 2 and Pascal insist that the type of any variable is declared and the contents of one type cannot be assigned to another. Functional languages evaluate the type of variables and other expressions. Semantically strict languages evaluate the type of a variable or parameter as soon as it is mentioned within the program, while lazy languages only evaluate the type of an object when it is actually used within the program.

The type declarations forced by strongly typed languages do make you check all variables, which is good discipline. However, some data typing can seem more annoying than useful, especially if a language forces you to write two versions of a mathematical function, one to deal with integers and the other for real numbers. Modula 2 even treats strings of different lengths as being of different data types. Languages which allow parameters to be of only a single type are known as monomorphic, but functional languages such as Miranda and Standard ML are allow polymorphic data types. A function with polymorphic parameters can have parameter values which are of different types depending on the context.

Multiple functions to perform the same operations on different data types in monomorphic languages will have to have different names, which can be tedious. Writing two functions called average_integer and average_real, to average integer and real numbers, seems much less sensible that writing a single averaging function that can deal with either type of number. This is possible in C++, Ada and other languages which support operator overloading. As many different functions as are needed to handle different data types can be given the same name and the correct function will be selected for the type of the data presented.

THE DATA TYPES AVAILABLE

The two basic types of data available in most languages are integer and real numbers. The other data types supplied will be constructed from the integers. Integers are whole positive or negative numbers and most languages restrict the range of integers available, depending on the number of bits allocated to represent the integer. Many languages provide the highest integer available as a constant, for example MAXINT in Pascal, allows you to test if an integer is within the legal range.

Real numbers include a fractional part. They were originally represented as fixed point numbers, where a number could only have a fixed number of decimal points, so that π would be 3.1415926539 to ten decimal places, but 3.142 to three decimal places. It is a very inefficient representation and the floating point representation is more widely used. A floating point number consists of the mantissa, which contains the significant digits, and the exponent, which indicates the magnitude of the number. In floating point representation, 2.146E6 is equal to 2.146x10^5 or 2,146,000. Negative numbers are given a negative exponent.

Remember that real numbers are imprecise and that you should not write routines based on measuring real numbers. If you need to check two real numbers for equality as an exit condition, then you must write the test using ‘less than or equal to’ or allow a margin of error, otherwise inaccuracy may mean that your routine never terminates.

Real numbers can be used as the basis of the complex type of number, which is the sum of a real and an imaginary number, but Fortran is the only language that supports this type directly.

- The most basic data types are integer and real numbers.
- Most other data types are built from the integers.
- New data types can be defined, but they must be based on existing data types.
- Type evaluation and checking is used to divide data in to categories, so that programs are less likely to go wrong.

Integers are used as the basis of other data types. Boolean values represent objects which can have two states, true and false, and are usually represented by the integers 0 for false and 1 (or -1) for true. This can cause problems if type is not checked, as it could be possible to add 5 and ‘true’ to get 6, which is nonsense.

Characters are represented by integers in the range 0 to 255. This 8-bit coding is known as the ASCII code, for American Standard Code for Information Interchange. The main problem associated with ASCII codes is that the association of code and character is not particularly memorable. The non-printing characters, such as control codes run from 0 to 32 and 33 represents a space, the first of the printing characters. A collection of characters is known as a string. Pointers, variables which store the address and identity of other variables, form another data type.

BUILDING NEW TYPES

Boolean values and characters can be listed; these are known as enumerated types. Numbers, whether real or integer, cannot be listed as the sets are infinite; they must be generated from an initial constant, 0, and a constructor, which calculates the next number in the series. If you wish to define a new data type, you must give the computer a method of calculating whether a value is of the given type. Ada, Pascal and Modula 2 allow you to define enumerated types. You can either specify all the values that qualify, for example:

```
TYPEmonths=(jan,feb,mar,apr,may,jun,jul,aug
,sep,oct,nov,dec)
```

or define the new type as a subrange of an existing type: `TYPE monthno=1..12`

Enumerated types are simply integer types which are renamed and assigned to different values. This is useful mainly for clarity. In the first example, the month names will be represented by the integers one to 12, as the numbers are in the second example. Pascal provides two functions for calculating the predecessor and sucessor of given instances of defined enumerated types, pred and succ. Using the first example, succ(aug)=sep and pred(may)=apr.

It is possible to define complex types in functional languages, based on the given types. The most used are cartesian products, disjoint unions and function spaces. Values of the disjoint union type can be of either of two given types. Cartesian products are ordered pairs of two given types and function spaces are functions that map from objects of one type to objects of another type. A function that took the name of a number and returned the integer would be typed as a function space from type character to type integer. ■

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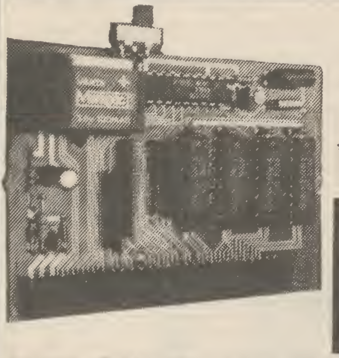

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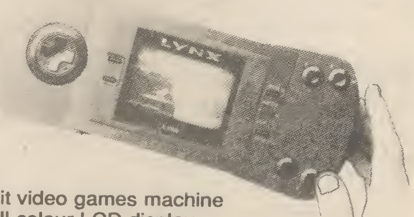

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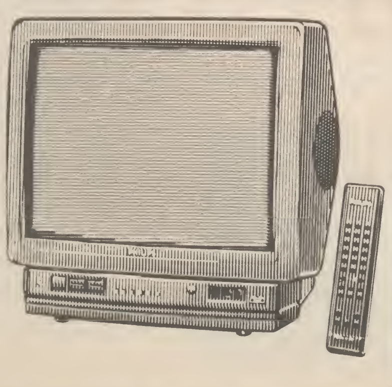

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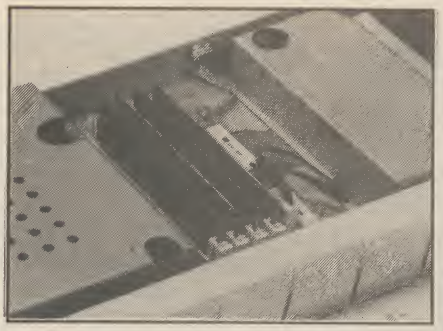

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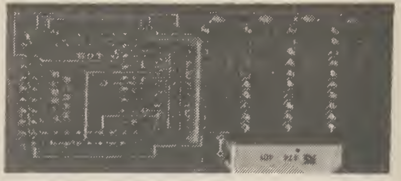

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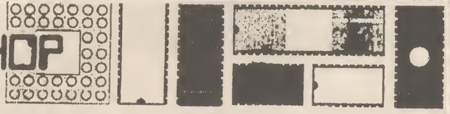

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CRYPTOGRAPHY & CODES - Mike Barlow, American Cryptogram Association 5052 Chestnut Avenue, Pierrefonds, Quebec HBZ 2A8 Canada

DATAEASE USER GROUP – High-Tech House, 10 Blackfriars Street, Norwich, NR3 1SJF
ECONET - Michael Ryan, Econet User Gp, Balkeerie Cottage, Eassie by Forfar, Angus DD8 1SR

DATA PD LIBRARY for Amstrad CPC users. Send SAE, tape/disk and 50p to Kingsmill 202 Park Street Lane, Park St, St Albans, Herts AL2 2AQ

DISABLED - Jeff Hughes, Special Needs User Group, 39 Eccleston Gardens, St Helens WA10 3BJ 0744 24608

DRAGON - Paul Grade, National Dragon Users Group, 6 Navarino Road, Worthing, Sussex or tel 0903 207585

EDINBURGH AMIGA OWNERS – I would like to form a user group for all us over 18s (we can go to the pub that way). Interested? Please phone me on 332-4938

EDUCATION - Charles Shannon, TECUG, 35 Wellington St, Gravesend, Kent DA12 1JG. Tel 0474 567 931

EIGHT-BIT BACK-UP 8-bit user group for all. 25p plus SAE. to: 8-bit back-up, 1 Northolme Close, Grays, Essex.

EINSTEIN - Graham Bettany, UKEUG 80 Dales Road, Ipswich IP1 4JR

EINSTEIN PD USER GROUP – Help and advice for all Einstein users. Over 100 disks of PD software. Send SAE to SW Knowles, 23 Howldsworth Rise, Arnold, Nottingham, NG5 8HZ

ELMSOFT PUBLIC DOMAIN SERVICE for the ST any weekend at Camden canal market, Haven Street, London

EMULATE. For Amiga, Amex. With monthly newsletter. Write to Pat 12b Northbrooks, Halrow, N Essex

ENTERPRISE – William Creaser, 6 Provident Street, Shaw, Oldham, DL2 8AQ. Independent Enterprise User group. Tel 0706 881382 from 7pm to 9pm

ENTERPRISE - Tim Box, Independent Enterprise User Group, 50 Holdenhurst Avenue, Finchley, London N12 0HX. Tel 081-346 8032

ENET (like Econet) - T K Boyd, Enet (Amcom) User Gp, Seaford Cottage, Petworth, West Sussex GU28 0NB

EXMOORE SOFTWARE – Queen Street, Lynton, N Devon EX 35 6AQ

FIND YOUR LOCAL CLUB - John Dale, Banc y rhosyn, 14 Bron Y Glyn, Bronwydd Arms, Carmarthen SA33 6JB. 0267 230 771

FORTH Language - Douglas Neale, FIG (FORTH Interest Group) UK, 58 Woodland Way, Morden, Surrey SM4 4DS

FRACTALS/CHAOS THEORY - Andy Lunness, 69 Bronte Avenue, Bury, Lancs BL9 9RN. Telephone 061-764 6469

GENEALOGISTS - Computer Group, Society of Genealogists, 14 Charterhouse Buildings, London EC1M 7BA. 071-251 8799

GENERAL AMIGA – disk based magazine for the Amiga. Only £1.50 per issue. Send order to 19 Earn Court, Alloa, Clacks, FK10 1PT

GENERAL HOME MICROS - Steve Winter, Chic Computer Club, PO BOX 121, Gerrards Cross, Bucks SL9 9JP 0753 884473

GUNNING PD ST PD – 47 Auchingane, The Tryst, Edinburgh, EH10 7HX

GUAGE - Martin Houston CUG (UK) Houston Technology Ltd, 14 Arden Oak Rd, Sheldon Birmingham BS26 3LX. Telephone 021-722 3168

HITACHI MBE 16002 PC - Bruce Ainge HICUPS 16 Nine Acres Road, Cuxton, Kent ME2 1EL. 0634 715759

HOUSING ASSOCIATIONS - Caroline Maries, Micro Users Ltd, Beaver Housing society, 23 Lewisham High Street, London SE13 5AF. Telephone 081-318 1126

HEALTH WORKERS - Sue Mckendrick, Healthlink, 164 Windsor Rd, Ashton-in-Makerfield, Wigan WN4 9ES. Voice: 0942 712 385

IBM PC - The IBM PC User Group PO BOX 360 Harrow HA1 4LQ.081-863 1191 BBS 081-863 6646

JOMAC USER GROUP – Spectrum and Amiga tips and pokes sent every month. Write with SAE to Jomac's, Filey Grove, Rhodes Street, Hull

JUPITER ACE – John Charter, Jupiter Ace Forth User Group, 17 Spring Wood Close, Dunston, Chesterfield S41 8BS. Tel 0246 237555

LOCAL AUTHORITIES – Local Authority Micro User Group, John New, Borough Engineer's Dept, Municipal Offices, North Quay, Weymouth, Dorset DT4 8TA.. Tel 0305 785101 ext 272

LOTUS PRODUCTS - Lotus User Group, 79-80 Peascod St, Windsor, Berks SL4 1DH. Telephone 0753 841686

LYNX – R B Jones, Lynx User Group, 39 Ashton Close, Needingworth, St Ives, Cambs

LYNX DISK USER GROUP – J Koushappas. 172 Pasteur Gdns, London N18. Tel: 081 807 3859

MEGADRIVE CONSOLE CLUB – Megadrive games new, old, bought, sold. Also exchange games. Andrew Stanford (0789) 764039

MEMOTECH FILE – 93b StJohns Road, Biddulph, Staffs ST8 6LL

MEMOTECH - Phil Eyres - Memotech Owners Club, 23 Denmead Road, Harefield, Southampton SO2 5GS. Tel 0703 585106

MICROSOFT WORD - Lesley Port, Folly House, Madeira Walk, Bachelors Acre, Windsor, Berks. Tel 0753 831001

MICRO-DESIGN USER GROUP – a new group for those PCW owners requiring assitance and advice with this DTP package. Large clip art library available. Phone Phil on 0709 543390

MID CORNWALL COMPUTER CO-OP – Atari ST. 8 Victoria road, Roche, St Austel, Cornwall PL 26 8JF. Telephone 0726 890473

MIDI/MUSIC – Spectrum music machine/MIDI user group. Magazine on tape, plus programs and lots more. For more details contact Sean Sanderson on 05242 62258

MOTOROLA 68xxx MICROS – write to Rick Applegate, 68 Microgroup, 8 Great Cob, Springfield, Chelmsford, Essex. BBS tel 081-316 7402

MSX SYSTEMS – write to Keith Neal, MSX Link, Austerby House, 80 Austerby, Bourne, Lincs PE10 9JL

NASCOM/80-BUS/CPM - Scorpio Systems, PO BOX 286, Aylesbury, Bucks HP22 6PU.Tel 0296 624868

NEWBRAIN - Ron Bury, NewBrain Support Grp, 70 Cranberry Lane, Darwen, Lancs BB3 2HL. Tel 0254 771891

NIMBUG – write to 13 Belle Vue Ave, Gosforth, Newcastle-upon-Tyne NE3 1AH. Tel 091-285 7806

NW ARCHIMEDES USER GROUP – Meets every Friday at Citizens Advice Bureau, next to Spectrum arena in Birchwood, Warrington. Ring Paul on 051-426 3915 after 6pm

OS/2 - Karen Burns, OS/2 User Group,Cecily Hill Castle, Cirencester, Glos LG7 2EF. Tel 0285 655888

OSBORNE/CPM/MSDOS – write to Jeremy Browne BOOG, 102a Aldershot Road, Fleet, Hants GU13 9NY. Tel 0252 621745 voice or 626233 BBS

PC/PD CLUB – write to 48 King William Drive, Cheltenham, Glos, GL53 7RP

PC SOFTWARE – PC Serve, 1147 Greenford Rd, Greenford, Middx UB6 ODP. Tel 081-864 2611, BBS 081-864 2633

PHILOSOPHY APPLE - G Haines, Chinese Room Club, 43 Cornwallis Gdns, Hastings, East Sussex TN34 1LX. Tel 0424 714 102

PICK OPERATING SYSTEM - Hugh Kellt, UK Pick Users Assocn, PO BOX 907, London N10 2SB. 081-462 4666

PRESTEL - Andy Leeder, ClubSpot 810, Church Farm, Stratton St Michael, Norwich, Norfolk, NRQ15 2QB

PSION ORGANISER - Mike O'Regan, IPSO, 130 Stapleford Ln, Beeston, Nottingham NG9 6GB. Tel 0602 735482

RESEARCH MACHINES - Steve Rochford RM National User Group, George Stephenson High School, Southgate, Killingworth, Newcastle NE12 0SA. Tel 091-268 2002

REVELATION (PICK) — write to Malcolm Frame, UK Revelation User Group, 136 Saint Albans Road, Watford WD2 4AE or Telephone 0923 35515

R:BASE – write to Mrs Tansy Beal, R:Base User Group c/o Room A2044 BBC Woodlands, 80 Woods Lane, London W12 0TT. Telephone 081-576 7187

S&T PD for the ST. Large selection of PD from £1. Send £1 or a disk and 50p for a list. All prices include postage and packaging. Send cheque or PO to Simon Eve, S&T PD, 6 Crediton Road, London, NW10 3DU

SA40 User group – write to Roy Williams, 17 Grove Road, Acton, London W5 6AW.

SANYO MBC-550 - M H Syed, Wistaria, 53 Acacia Grove, New Malden, Surrey KT3 3BP. Tel 081-942 9009

SCHNEIDER EURO PC - Alex Kefford, SEPUG, 11 Crabbet Road, Three Bridges, Crawley, West Susex RH10 1NF

SCIENTIFIC PC USERS – write to Tim Bunning, SPCUG PO BOX 17, Retford, Notts DN22 6BQ Tel 0777 709009

SEGA SWAP CLUB – Exchange your old megadrive/master system carts –10 Sandwith Road, Todwick, Sheffield, S31 0JP

SERIOUS GAMER – Flat C, 43 Colvestone Crescent, London E8 2LG. Tel 071 241 5446.

SERVICES USERS - Squadron Leader G Howson, Services Personal Computer Association, Stlk Eng 15a HQSTC RAF High Wycombe, Buckinghamshire

SHARP USERS CLUB – contact Andrew Ferguson, 11 Harcourt Close, Henley-on-Thames, Oxon RG9 1UZ. Tel 0491 574850 evenings only

SIRIUS – Simon Sheppard, ISSUE PO BOX 222, Brighton BN1 3BR

SHREWSBURY AMIGA USER GROUP – informal meetings and lots more planned. Write with SAE to A Preece, 1 Haughmond Court, Featherbed Lane, Harlescott, Shrewsbury, SY1 4NJ.

SOFTWARE EXCHANGE – send an SAE for information to 13 Bourneville Lane, Birmingham, B30 2JY or phone 0860 444594 from12pm to 10pm

SOLITUDE MOUNTAIN – Friendly new Amiga user group. Send blank disk or 50p to 565 Heathway, Dagenham, Essex

SORD M-23 – B Nicholson, Schlumberger Norge A/S Bjergstedveien, 4007 Stavanger, Norway. 474 657002

SMART SYSTEMS USERS – write to Francis Barton, Basement Holy Rosary church, Louis Street, Chapeltown, Leeds LS7 4BP. Tel 0532 629202

SOUTHERN AND DISTRICT. PC and ST user group.Tony Lowes 61A Broadway West, Leigh on Sea, Essex S59 2BX

SPECTRUM PLUS 3 USER GROUP – monthly magazine. 57 Lovers Walk, Dunstable, Bedfordshire, LU5 4BG

SPECTRUM DISCOVERY CLUB – magazine on disk for the Opus Discovery Disk Drive and the Sam Coupé. BD Mumford, 57 St Saviours Road, West Croydon, Surrey, CRO 2XE

STEN – the ST enthusiasts newsletter. Dave Mooney, 14 School Road, Morningside, Newmains, Lanarkshire. Tel 0698 382380.

STOS magazine, out every month.Send an SAE for full details to 11 Shore Crescent, Bishops, Waltham, Hants SO3 1DZ

SUPERPROJECT - Geoff Groom, 3 Sunnymeade Ave, Carshalton Beeches, Surrey, SM5 4JA.. Tel 081-643 3336

SYNCROSOFT – Exclusive 64 computer information. Hardfacts, trouble shoots, pocket book. £2.95 to join, including p&p. Make cheques to Syncrosoft and send them to 9-10 Morland Gdns, Southall, Middx UB1 3DY

TAS (DATABASE) - Neil Hegarty, TASUG C/O Solutions for You, 1st Floor, 2 Lytton Rd, New Barnet, Hertsm EN5 5BY. Tel 081-441 1133, BBS 081-449 4171

TCS PD – over 250 disks to select from only 99p. Send SAE to 40 Upton Gardens, Tarring, West Worthing, Sussex.

TANDY/MS-DOS - Roger Storrs, NATGUG Oakfield Ldge, Ram Hill, Coalpit Heath, Bristol BS12 2TY. Telephone 0454 772 920

TEXAS T199/4a - Peter Brooks, International TI User Group 96 Banbury road, Oxford OX2 6JT. Telephone 0865 510822

THUNDERNEWS – CBM 64 user magazine on disk/tape. Send sae for details and competition to 159 Hough Road, Wallsall, West Midlands WS2 9BG

TIUGUK – TI99/4A user group UK for S/W on disk, tape and module. Offers magazine and help. Write with SAE for more details to Peter Walker, 24 Bacons Drive, Cuffley, Potters Bar, Herts EN6

TRANSPUTER - Howard Oakley, Transputer User Group, Brooklands Lodge, Park View Close, Wroxall, Ventnor, Isle of Wight

TYPECAST! – PD library for the ST/STE. DTP, WP, clip art and art programs. Paul Sealy, 31 Hartfield Crescent, West Wickham, Kent BR4 9DW.

UNIX USERS – UKUUG Secretariat Owles Hall, Buntingford, Herts, SG9 9PL. Tel 0763 73039 /73255 (fax)

VENTURA PUBLISHING - VPU (Ventura Publisher User group) Linda Liddell VPU c/o LLA Lound House, Forncett St Mary, Norfolk, NR16 1JP. Tel 0508 41580

WORDPERFECT – Michael Norman, Wordperfect User Group (UK) Dove Barn, Manor Farm, Wootton Woodstock, Oxon, OX7 1DX. Tel 0993 812 670

WORDPERFECT – Dr Ian Barton, A Perfect World, High Rigg, Alma Rd, Tideswell, Derbys SK17 8LS. Tel 0298 871 925

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Hawk'S Castle	0344 411621	Hst
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Hilary's Board	0277 233468	V21/23
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Humber Bridge	0482 850785	V21/22/23
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Kernow Bb	0209 821670	V21/22/22b/23
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Labyrinth	051-724 4458	V21/23
Lamplight Qbbs	0705 811531	V21/22/22b/23
Laser Tbbs	0532 438430	V21/22/22b
Lau'S Ql Bb	081-751 6096	V23v
Lightfinger's Place	0202 485723	V21/22/22b/23
Linelight	0580 212043	V23v
Linx Bbs	0522 511277	V21/22/22b/23
Liquorice Allsorts	0633 279985	
Liverpool Mailbox	051-428 8924	V21/22/22b/23
Liverpool Ros	051-931 4271	V21/22/23
Loch lomond	0389 55762	V22/v22bis
Loft	0442 230461	V21/22/22b/23
Logical BBS	0772 623167	300-2400
Log On In Tynedale	0434 606639	V21/22/22b/23
London Bb	081-455 6607	V21/22/22b/23
London City Mag	081-468 7648	V21/23/23v
London Connexion	081-667 1313	V21/22/22b/23
London Embassy	081-366 1778	Hst
London Guest Hse	081-748 0974	Hst/v32
London Mail Centre	081-534 1200	V21/22/22b/23
London Metropolis	081-519 1055	V21/22/22b/23
Loony Bin	0703 787489	V21/23
Mabbs	021-444 8972	V21/22/22b/23
Mach II Bbs	0242 260 685	V21/22/22bis
Mactel Hq (gm Box)	0602 455444	V21/22/22b/23
Mactel Metro	081-543 8017	V21/22/22b/23
Mactel Phoenix	0473 610139	V21/22/22b/23
Madness Bbs	0603 300947	V21/22/22b/23
Magic Castle Bbs	021-430 3761	V21/22/22b/23
Magic Mushroom	0361 83641	V21/22/22b
Magnum	0274 547006	V21/22/22b/23
Magrathea	0376 24402	V23v
Manor	0980 863031	V21/22/22b/23
Marctel	081-346 7150	V21/23/23v
Matrix	051-255 0225	V21/22/22b/23
Mbbs Leconfield	0964 550745	V21/22/22b/23
Mbbs Mitcham lic	081-648 0018	V21/23
Medway	0634 280031	V21/22/22b
Mektronic Cnsltnts	061-773 7739	V21/22/22b/23
Mercianet	0203 611943	V23v
Merkinstead	061-434 7059	V21/22/22b/23
Merlin	0443 834179	V21/22/22b/23
Mgbbs	0443 733343	V21/23S
Micro Live Bb	081-567 6500	V21
Micro Update	081-877 1529	V21/22/22b/23
Microdeal	0726 65422	V21/22/22b/23
Microlog	0422 71921	V21/22/22b/23
Microview!	081-509 0729	V23v
Midget Gem	0748 834836	V21/23
Midnight Caller	0633 279243	V21/22/22b/23
Mind Boggles	0362 762868	V21/22/22b/23
Mininet 3	0642 672813	V21/22/22b/23
Miracom Support	0473 232540	Hst
Mirage	061-652 1242	V21/22/22b/23
Mirror Ii	0628 810889	V21/22/22b/23
Mirrorworld/quest 1	0883 844044	V23
Mission Impossible	0602 654329	Hst
Mk Board	0908 311005	V21/22/22b/23
Mkbbs	0908 504556	V22/22b
Monkey Tree	0952 677002	V21/22/23
Monusci	0293 545665	V21/22/22b/23
Motor Exchange	0484 435314	V21/22/22b
Multi-bbs	041-649 9043	V21/22/22b/23
Murdoch'S Hangout	021-711 2620	V22/22b
Murky Caverns	081-426 9386	Hst
Mwcfe	0926 421844	V22bis
My Little Phoney	0865 773277	V32/HST
Nicc Mid-west	0341 250377	V21/22/23
Nite Life	071-976 6807	V21/22/22b
No Escort Required	081-200 3817	Hst
No.1 Bbs	081-958 1689	V21/22/22b
Norpac	0434 608324	V21/22/22b
North Wales Bb	0978 88372	V21/22/22b
North Yorks Qbbs	0423 868065	V22/22b?
Northern Lights	0768 773685	V22/22b
Norwich Onion Bbs	0603 423305	V21/22/22b/23
Nova	0455 553371	V21/22/22b
Nova-net	0274 370760	V22
Odd-ball	081-679 2583	V21/22/22b/23
Open Access	081-427 3974	
Optix	0482 872294	V21/22/22b/23
Organic Garden	081-464 3305	V21/22/22b/23
Out Of The Blue	081-668 7667	V21/22/23
Owl Service	0532 605876	V21/23
P'S & Q'S Tel	051-236 3105	V21/22/22b/23
Pacific Lightning	0732 845338	V22/22b
Packet Bbs	081-547 1479	V21/22/2
Packet Place	0484 435620	V21/22/22b
Palm Beach	0303 265979	V21/22/22b/23
Pazaz Viewdata	0383 620259	V23v
PC Access	071-608 0081	V21/22/22b/23
PC Forum	0322 335348	V21/22/22b/23
PC Serve Shop	081-864 2633	V21/22/22b/23
PC Serve Softnet	0895 420164	V21/22/22b/23
PC Serve Storehouse		
	0494 728094	V21/22/22b/23
Pc-vax Opus	081-800-3549	V21/22/22b/23
Pcamiga Bbs	0602 735119	V22/22b
Peacenet West	0895 448998	V23v
Pecan Software BBS		
	0272 248076	V21/22/22b
Penguin	0943 830820	V21/22/22b/23
Phantom	0226 340425	V21v/22v/23
Phoenix	0249 817704	Hst
Piston Popper	0424 853361	
Plug-ole	021-472 0256	V21/22/22b/23
Plus And Minus	0559 322766	V21/22/22b/23
Poacher	0476 62450	V21/22/22b/23
Polynet Bb	071-580 1690	V21/22/22b/23
Port Of Call	081-391 5779	V21/22/22b/23
Power Play Qbbs	0698 423669	V21/22/22b/23
Power Tower	0533 880114	V21/22/22b/23
Prestonet	0772 612462	V23v
Project Bbs	0384 401770	V21/22/22b/23
Prometheus	081-300 7177	V23v
Proximity	0793 480028	V21/22/22b/23
Publishing Shop	091-261 5228	V21/22/22b/23
Purely Pc	0232 645942	V21/22/22b
Pyramid	071-239 0871	V21/22/22b
Pyroto Mountain	0895 59071	V21/22/22b
Really Interesting	0582 414991	
Reflex Bbs	0703 685527	V21/22/22b/23
Regency Bbs	0542 33050	V21/22/23
Remote!pcw	0555 851887	V21/22/22b/23
Rivendell	0602 640488	V21/22/22b/23
Rm Tech. Support	0865 796431	V21/22/22b/23
Road Runner	061-483 4105	V21/22/22b/23
Roamer I	0292 45345	Hst
Royalink Uk	0962 66807	V21/22/22b
SAC Bbs	0242 260685	V21/22/23/22b
Sas Bbs	0742 325232	V21/22/22b/23
Satellite Southwest	0392 53116	V21/22/22b/23
Scabs	0909 479080	V22bis
Scary Monster	0734 320297	Hst
Scot Air	0505 36036	V21/22/22b/23
Scothelp-st	031-313 2734	V21/22/22b/23
Scottish Opus	041-880 7863	V21/22/22b/23
Scottish Wildcat	0674 671141	V21/22/22b/23
Scs One	0444 236002	V22b
Sector	0772 454328	V23v
Semaj Qbbs	0303 862415	V22/22b
Sentinel Bb	0628 781429	V21/22/22b/23
Shades	0342 810905	V23
Shadowfax	0252 528146	V21/22/23
Shadowland	081-897 0488	V21/23
Shareware Library	0424 83654	V22/22b
Shasby'S Lair	0772 561066	Hst
Sherwood Forest	0602 397113	V21/22/22b/23
Short Circuit	0273 462967	Hst
Sid (acorn Service)	0223 243642	V23v
Signal Box	081-337 6583	V21/22/22b/23
Sin Bin	0532 661536	V23
Sirius	081-542 3772	V21/22/22b/23
Sirius II	0494 778425	V21/22/22b
Skull's Tower	081-943 1194	V21/22/22b/23
Sky-line	0603 742273	V21/23/23v
Skyline 1	0234 741691	Hst
Softmatic Bbs	0733 322540	V21/22/22
Software Source	0892 661149	V22/22b
Sorcerer's Dungeon	0636 815705	
Sounds Of Mercia	0203 682896	V21/22/22b
South Lincs BBS	0780 63954	
Sparx	0793 480287	V21/22/22b/23
Split Infinity	0342 712248	V23v
Pook Bbs	0268 767365	V21/22/22b/23
Sphere BBS	0294 221350	V21/22/23/22b
Sputnik Spitfire	0501 31754	V21/22/22b
St London Bbs	081-443 2432	V21/23
Stabb	0793 855176	V21/22/23/22b
Staines Bb	0784 465794	V21/22/22b/23
Starbase One	071-733 3992	V21/22/22b/23
Strange Brew!	081-665 5038	V22/22b
Stun User Network	061-429 9803	V21/22/22b/23
Summer Wine	0484 653234	Hst
Sunburn Inc.	021-449 5269	V21/23
Super Ops Bbs	0782 284081	V21/22/22b
Swindon Newc Bb	0793 616683	V21/23
System-c-v	0403 50607	Hst
T.a.b.b.s.	0533 517615	V21/22/23
Tabbs	0225 743797	V21/22/22b/23
Taecomm	0994 6709	V21/23
Taff'S Retreat	0834 4562	V21/22/22b/23
Tardis	0772 27236	V21
Tasque	0355 222664	Hst
Tasug Opus	0904 760129	V21/22/22b/23
Tavern	081-445 6514	V21/22/22b/23
Tbbs-rovoreed	081-542 9767	V21/22/22b/23
Tequila Sunset	0703 867786	V23v
Terminal Net 5	0402 456135	V21/22/22b/23
Terminal-net	081-423 5262	V21/22/22b/23
Tharr Bbs	0234 261804	V22/22b
Third Wave	071-585 3163	V21/23
Three Kings	0354 56267	V21/22/22b
Track 83	0953 851351	V21/22/22b/23
Transylvania	0274 621668	
Tranz-com Bbs	081-952 6273	V21/23
Trinity I	0392 410210	V21/22/22b/23
Trinity Ii	0367 22764	V21/22/22b/23
Tug II	0905 775191	V21/22/22b/23
Twilight Zone	081-788 0884	V21/22/22b/23
Twilight Zone II	071-608 1485	Hst
Uk Healthlink	0942 722984	V21/22/22b/23
Unisys Etoi Bbs	081-453 5739	V21/22/22b/23
Unit One	0285 713688	V21/22/22b
V.i.t.a.s.	021-749 5860	V21/23
Valente'S Bbs	071-978 2078	Hst
Vector System	0329 45824	Hst
Viking East Anglia BBS		
	0255 503048	V23v
Village	081-464 2516	V21/22/22b/23
Village Fayre	081-841 5971	V23
Voyager Bbs	061-725 9580	V21/22/22b/23
White Lightning	0635 37259	V22/22b
Whitehall Pent	071-930 3903	V21/22/22b/23
Wild Imaginings	091-263 4303	V21/22/22b/23
Winchester Remote	0962 69322	V21/22/22b/23
Wolver'ton Ros	0902 745337	V21/22/22b/23
Womble Base	081-979 9606	.V23
Woodgreen Bbs	081-889 5624	V21/23
Yugo Bbs	0734 753648	V21/22/22b/23
Zeus Bbs	0487 710487	V21/22

Not just a load of old Pigswill

Manchester has more than its share of bulletin boards and most of them are pretty good. We dropped in to trough at the Pig Pen and were pleasantly surprised at the quality of swill doled out by Orwellesque sysop Napoleon.

Good file areas, interesting mail, efficient netmail and a host of other goodies were on offer for registered piglets. Oink!

Pig Pen Facts:
Telephone: 0706 821837
Speeds V21,22,23,22bis

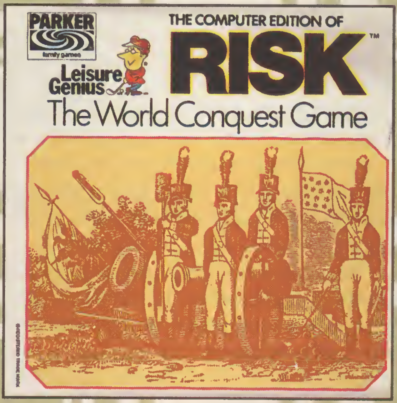
LEISURE GENIUS

Virgin
Leisure
Genius

THE NAME SPEAKS FOR ITSELF

Virgin
Leisure Genius
SCRABBLE
De Luxe
SPEAR'S GAMES

SCRABBLE DE-LUXE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Leisure Genius
RISK
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RISK

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presents
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the exciting game of international intrigue

DIPLOMACY

Leisure Genius
PRESENTS THE COMPUTER EDITION OF
Waddingtons
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MONOPOLY DE-LUXE

also available:
***MINDSTRETCHERS** featuring*
SCRABBLE, MONOPOLY, CLUEDO on
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*and: **CLUEDO***
on Spectrum, Amstrad and C64

	IBM PC	AMIGA	ATARI ST	CBM 64 DISK	CBM 64 CASS	SPEC +3	SPEC CASS	AMS DISK	AMS CASS
SCRABBLE DE-LUXE	●	●	●	●	●	●	●	●	
MONOPOLY DE-LUXE				●	●				
CLUEDO MASTER TEC	●	●	●						
DIPLOMACY	●								
RISK	●	●	●	●	●				

Virgin
GAMES

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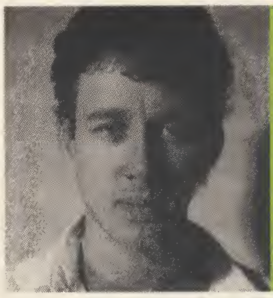


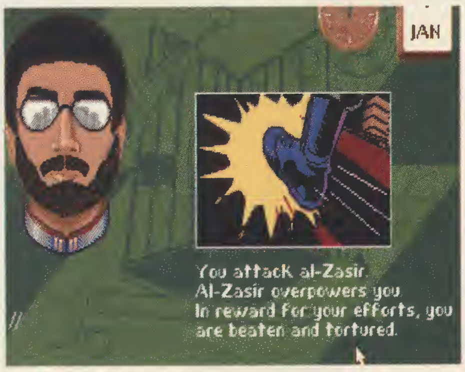
GAMES WEEK

All that's best in computer entetainment

MICROPROSE FIXES £30 TAG

MicroProse has decided that next year's entire line-up of games will retail for just under the £30 mark. Throughout 1990 MicroProse began to establish the £30 price-point as an indicator of quality products. *MidWinter, F-19 Stealth Fighter* and *M1 Tank Platoon* all came in large boxes with humungous manuals and a price to match. In an attempt to justify the price rise, all 1991 MicroProse 16-bit games will come in similarly large boxes.

Originally games selling for £25 were recognised as being superior but companies like US Gold have eroded this idea by releasing such unplayable software as *Line of Fire* and *ESWAT* at this price. 1991 may be the year in which we see the price point for all 16-bit games rise to £30.



You attack al-Zasir.
Al-Zasir overpowers you.
In reward for your efforts, you are beaten and tortured.

• The first of MicroProse's £30 games for 1991 is the follow-up to MidWinter - Flames of Freedom, *expected in March.*

MORE COMIC CAPERS

If you haven't seen Readysoft's latest cartoon game then expect it very shortly. *Dragon's Lair II: Timewarp* carries on from where the original *Dragon's Lair* left off.

Princess Daphne has been spirited away by the evil wizard Mordroc who wants to get her into his bed. You are transported by a time machine to Mordroc's lair and must battle your way through 50 screens of action to rescue the delectable Daphne.

Like other Readysoft games it features some superb animation effects but the gameplay is sadly lacking. Instead of battling with dragons you simply have to make the right joystick movements at the right time. Thus, to survive a screen you might simply have to move the joystick left twice and right once to escape.

This Disney-style cartoon adventure comes on a mammoth six disks and features some of the finest animation you'll ever have seen on your machine. ST and Amiga versions are available at the moment for a hefty £44.95.

Contact distributor, Entertainment International, for more details on 0268 541126.

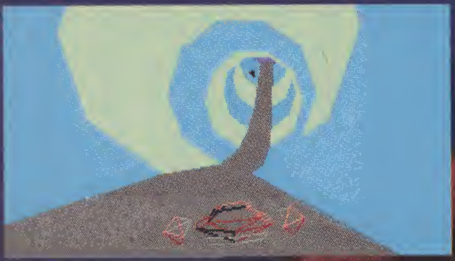
ENCHANTED DREAMS

Thalion is known for such releases as the thoroughly absorbing *Atomix* and the more recent *Dragonflight*, an adventure of mammoth proportions. *Enchanted Lands* is its first journey into the cutesy game genre but don't let this put you off. I've laid my hands on near completed Beta test versions of *Enchanted Lands* and the signs are that it's something to watch out for.

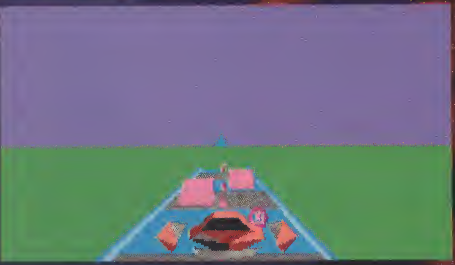
The action scrolls horizontally (and occasionally vertically). The objective is to work your way forwards to find the exit to the level and defeat all the problems in your path. A vast number of collectable bonuses can be picked up, extending your weaponry, giving you more lives and improving your abilities. Beautiful graphics, smooth scrolling and colourful skies make this a wonderful game to play. *Enchanted Lands* is due to be released at the end of January for £24.95. ■

STUN RUNNER

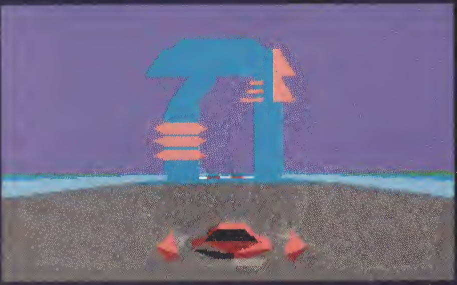
Domark • £24.99



• Prepare for the journey of your life, racing round miles of interconnecting tunnels to become the ultimate STUN Runner.



• Out into daylight for a quick nose round. Don't relax too soon though, there's a STUN Runner on your tail.



• Oh no! Get ready to chuck up your lunch as you race down to the city.

Not such a stunning running!

The arcade game went down a storm. The lunch-repeating speed of your journey through twisting coloured tunnels was unbelievable. Just speed up and keep your finger on the fire button and you just couldn't stop yourself from blasting the bad guys.

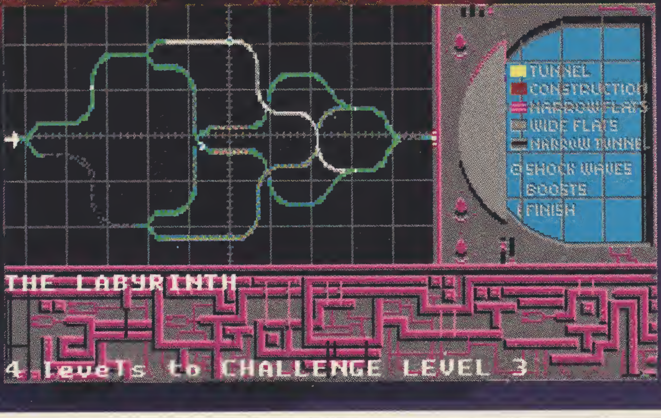
Now Domark has converted this superb arcade entertainment onto the home micro. At the moment only 16-bit versions of *STUN Runner* have been coded because 8-bit machines just couldn't handle the speed.

The objective is to race your futuristic racing vehicle – the STUN Runner – through a series of twisting tunnels, picking up bonus stars for points and prizes and watching out for any other STUN Runners who may also be in the vicinity.

You can blast opponents in the tunnel by hitting the fire button to send out a laser then move this laser up and down using the joystick. There are a variety of enemies to watch out for, depending on the track you reach. These include flying, missile-armed flyers, weaving cycles and armoured drones who are resistant to your firepower. You ultimate objective is to reach the 24th track where on completion you gain fame and riches.

This would be a brilliant game if only Domark had managed to retain the amazing speed of the original. As it is, the tunnels are made up of filled coloured polygons, effectively shaded to give a tunnel impression. Unfortunately, they move so slowly and jerkily that the action is severly hampered. Fire your weaponry and the best you see is a short burst of yellow light – where are the flashing lasers and great sound effects?

This was a brilliant arcade game with so fast that it was impossible not to become addicted. When Domark announced it had obtained the licence everyone said it would be tricky to convert but hoped for the best. Sadly, it seems that *STUN Runner* was just too big a job for the programmers to handle. Without the same speed and sampled sound effects, the game is not only awkward to get to grips with but virtually unplayable. If you loved the coin-op game you'd be better off saving your money and spending it in the arcades.



THE LABYRINTH

4 levels to CHALLENGE LEVEL 3

• Keep track of where exactly you are in the maze of tunnels and see how much further you have to go with this map.

ARMADA & BORODINO

Arc • £29.99 (Twin pack)

Atari on the war path

Arc, Atari's games software arm, has just released the Battlescapes twinpack on the ST, Amiga and PC. This pack comprises two games – *Armada* and *Borodino* which have both picked up awards for best wargame.

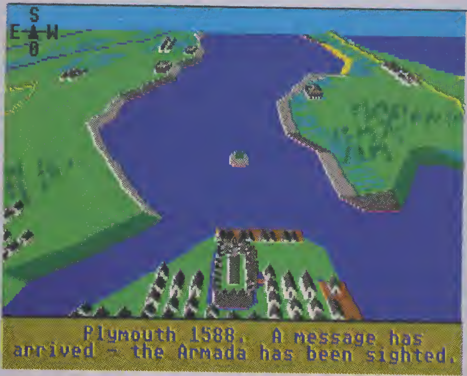
These two Battlescape war game simulations were written by Dr. Turcan and are acclaimed as the most realistic wargame environment ever produced on a home micro.

Armada enables you to re-enact the five days of the Spanish Armada from Plymouth to the Isle of Wight. On the other hand, *Borodino* is a land-based war fought between Napoleon and the Russian Prince Kutusov. In the real battle 131,000 French took on 120,000 Russians but succeeded in gaining little more than a moral victory. Could you have changed the course of history?

The Battlescape wargames feature an effective 3D landscape shown as if from the eyes of the general. To issue commands to your captains you use messengers to convey your orders. Some captains may rebel or they may choose to follow their own course of action. Just as in a real war situation, even the general doesn't have total control.

To use the Battlescape wargames you need to get to grips with a complex but logical set of command instructions. You pass your orders to the ST by typing them as you would say them: for example, "Longfellow, form an attack line from a to b". Once you have learnt the language from one game you have more fun playing others because you already know how to issue your instructions.

These twinpacks are selling for the reasonable price of £29.99 on ST, Amiga and PC. For further information contact Arc on 0753 33344.



Plymouth 1588. A message has arrived - the Armada has been sighted.

• *The Turcan Battlescape war games are revolutionary – they're so real you feel like you could really be playing the part of Napoleon. Now you can have two wargames for little more than the price of one in Arc's new compilation.*

MIDNIGHT RESISTANCE

Ocean

Battle through midnight with less resistance

If you've managed to get hold of this classic piece of shoot-'em-up action, here's some handy advice on battling your way through the levels without losing too much blood.

FIRST LEVEL

Just board the jeep and drive until the scaffolding appears.

LEVEL TWO

At the first shop try to buy three-way, extra bullets and homing missiles. If you can't make sure you get the three-way shot then try for the shotgun instead. This level is easy, you just have to remember to watch out for grenades. When you reach the machine gunners, lie down above the middle one and fire down on top of him. Now you can shoot the rest from here. On encountering the moving floors, fire diagonally in the opposite direction. As you reach the end of the first level and the missle launcher makes its appearance position yourself beneath it. When you're standing on the dustbin lid fire directly underneath.

LEVEL THREE

Try to buy the three-way shot again and homing missiles. If you have enough money, lay your hands on the barrier. Level three is rather long. When you reach the first machine, lie down on the ground and keep firing at it. Occasionally it hits you but most of the time you can avoid it. On the rising platform make sure you get on the middle left and fire in one direction. When you have four shots left, stand in the left hand corner and fire along the ground when the bad guys come down. Once you've killed them, fire straight up and use your homers. You can kill the big scuba before it gets you and then just stay there and fire as the second blade sweeps across the ground. When the eye fires at you just blast your homers at it twice and it soon bites the dust.

LEVEL FOUR

If you already have sufficient ammo and homers then buy yourself an extra life. You'll need it. Lay your hands on the three-way shot for this level which is a cinch right up until the planes come along. Make sure you jump into them and fire your homing missles.

LEVEL FIVE

In the shop you can choose anything you want since this is a dead easy level. When you reach the helicopters, just keep firing your homers until they're all destroyed. When you reach the electric man, make sure you go down as far as you can and wait until the screen moves to the floor. Jump down in between the bullets and then it's easy to kill him. But make sure that you shoot the electric beams first.

LEVEL SIX

In the shop you need to buy homer missiles otherwise the level is virtually impossible. Once you fall down the first floor just concentrate on the medium blade and once you have it lie down and shoot ferociously. On the next drop, face one way and shoot the the bad guys coming at you. Kill the enemies from behind using your homers. The next drop has two blades coming from each end. Following them are more men, two after each other.

LEVEL SEVEN

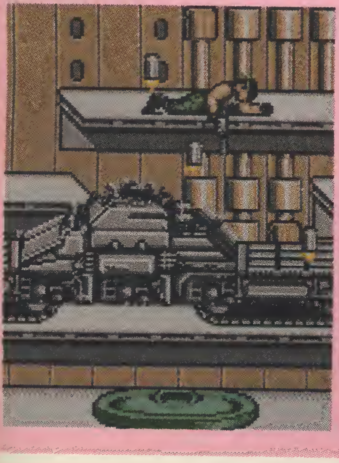
Choose the homing missiles again and when the ship passes fire the homers while keeping on the move. Aim the guns in the middle and then wipe out the rocket launchers.

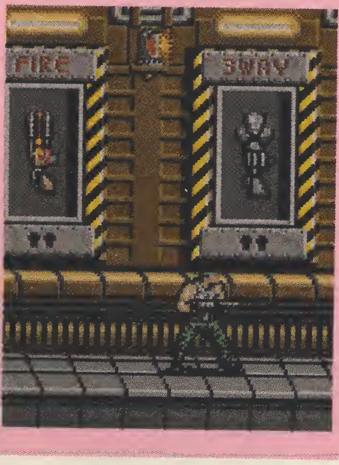
LEVEL EIGHT

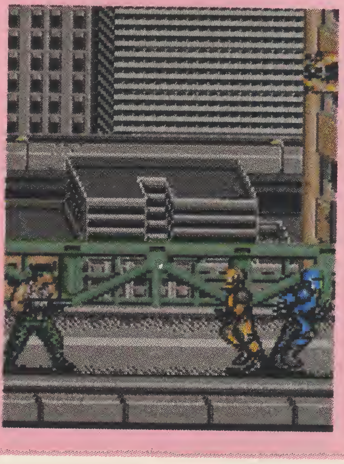
Climb one of the ladders and shoot six yellow men to collect all six keys. When you reach the top carry on firing homers and shooting. Jump over the caterpillar when it reaches the ground, then shoot the skull and continue climbing the ladder.

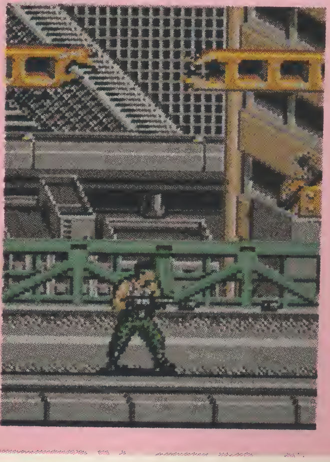
LEVEL NINE

If you have the six keys then jump and take every item you can to release the hostages. On this level shoot the faces as quickly as possible. When you reach the head, fire diagonally at it . When it's in line run across to the left corner and fire diagonally right until you kill it.









CONSOLE ZONE

Richard Frederick enthuses over the console version of Strider and reports on the Powerglove for the NES.

BEST BUYS

Welcome to a regular new feature in The Console Zone. Confused by the huge range of video games out there? Been stung by a real turkey? Don't sweat it. Sit back, take it easy and discover the top titles for your console. This week we reveal what's great on the Gameboy...

TOP GAMEBOY TITLES

1) *Super Mario Land*
Mario, the video game hero more popular than Mickey Mouse in America, is back in another scrolling arcade platform game. Mario must cross deserts, roam underground caves, duck underwater and fly through the skies in a four world adventure to rescue Princess Daisy.

2) *Batman*
Stop the press, the Caped Crusader is on the streets of Gotham City in a search and destroy mission to end the Joker's reign of terror. Our black knight has a brilliant range of batty weapons to find and use. *Batman* has some of the best graphics yet on the Gameboy.

3) *Teenage Mutant Ninja Turtles*
Like mondo beyondo, those hip heroes in a half-shell are ready to kick it with Shredder and his Foot Clan cronies in a five-level beat-'em-up.

4) *Revenge of the Gator*
Pinball with a hint of reptile. Four scrolling screens of action and four secret bonus areas induce the very embarrassing habit of tilting your Gameboy during play. This one- or competitive two-player pinball simulation is the best in the biz.

5) *Nemesis*
The cult coin-op from Konami that started the craze for collectible pods in scrolling shoot-'em-ups can now be played in the palm of your hands. Battle through five levels and two hidden bonus stages filled with power-ups, multiples, walking robots and giant mother ships.

GAME OF THE WEEK

***Strider* • Megadrive • ¥7,000 /£28**

If you thought *Golden Axe* was a superb coin-op conversion wait till you play *Strider*!

The date – 2048. The place – Russia. The mission – deadly. An evil syndicate has overthrown Russia and is using its scientific and military might to take control of the world. In the role of Strider you land, via hang-glider, in an industrial town and begin your quest to defeat the evil mastermind.

Using incredible acrobatic skills, you leap onto moving platforms, climb to the top of I-beams with your grappling hook and slide – with heels dug in – down steep slopes while evading razor sharp spokes. With only a trusty laser sword and swift hover-craft, you take on mutant centipedes, ancient dinosaurs, pirates, mad dogs, monkey-like mechanical robots and finally the evil mastermind in his mechano-skeletal headquarters.

Help is at hand. A special item gives you a super sword and if you collect two drones you'll get a white mechanical panther to help your assault. Beyond the start-point lie frozen wastes, mechanical jungles and gigantic battleships filled with mad wolves, piranha fish and Amazon women.

Strider is the first 8Mb cart on the Megadrive and is packed with gorgeous graphics, 32 tantalising tunes and over 40 sampled and synthesised sound effects. It's so close to the source, you won't know if you're playing the superb Megadrive conversion or the original Capcom coin-op!

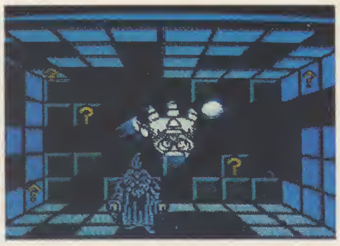
• **Strider:** ***a conversion so good you might forget you're playing the console version.***

NINTENDO SUPER FAMICOM

Kemco-Seika in Japan has produced the Super Famicom conversion of possibly the best French role-playing game ever released. Infogrames' *Drakkhen* lets you control a party of four bold adventures through dungeons and fantasy lands. Stargazers should note that the star formations in the game are an accurate representation of the skies above a small town in the south of France where the original programmer lives. *Drakkhen* costs ¥8500 (£34).

NINTENDO ES

Mattel has released a new game for use with its novel cyberspace controller, the Powerglove, which plugs into the NES like a joystick, but you wear it! Now you can literally punch Mike Tyson out with your own fist.



• **Super Glove Ball:** ***Mattel takes advantage of the latest Nintendo innovation.***

It was designed by VPL in California, which uses NASA technology to produce the next generation of computer control and display systems.

Inside the Powerglove, conductive ink is printed on strips of Mylar plastic. When you flex your fingers the ink strips stretch altering their resistance to low-voltage electric charges, thus producing a guide to how you're moving your fingers. There is also an NES controller woven into the wrist of the Powerglove and ultrasonic emitters that help chart the your position relative to the receivers on a frame attached to your TV.

It maybe primitive compared to the other million-dollar 'virtual reality' systems around but it does work. *Super Glove Ball*, the latest Powerglove game from Mattel, is a sort of wacky video handball. "No longer is gameplay limited to left, right, up and down. Now you've got depth," says Mattel. "You move in. Out. Catch the ball. Throw it back. You'll feel like you're really in the action."

You're trapped inside an alien spaceship and the only way to escape is by busting through its tiles, knocking down its walls and making your way through a maze of rooms filled with sharks, wizards and rasta bombers. I'll leave the last words to Mattel: "Once you play *Super Glove Ball*, everything will seem... flat." ■

TOP SCORERS

GAMEBOY		
Batman	424,060	Peter Worth
Super Mario Land	923,020	Gary Sanderson
Tetris	396,064	Peter Worth
MEGADRIVE		
Ghouls 'n' Ghosts	750,000	Tim Walker
Golden Axe	414.5	Alex Taylor
Thunderforce III	3,564,100	Nicholas Wells
LYNX		
Blue Lightning	240,950	David Will Henderson
California Games	100,743 *(Footbag)*	Nicholas Wells
California Games	8,100 *(Surfin')*	Nicholas Wells
NINTENDO ENTERTAINMENT SYSTEM		

PLAYING TIPS

NINTENDO ES
Five, four, three, two, one. *Thunderbirds* are go! Select any level by pressing [Up] and [Left] simultaneously while resetting the game. Next hold down [Button A], [Button B] and [Select].

ATARI LYNX
David Will Henderson from Galashiels in Scotland has found a hidden feature in *Blue Lightning.* A vertical runway appears in the clouds on mission seven. You can fly up, through and past it and nothing actually happens! David wants to know if it's a bug or mystery feature? Over to you, Atari.

NEC PC ENGINE
Kick some baddie butt in *Street Fighter* by pressing [Button I]. The resulting pause-mode flickering on and off will give you an edge. This only works if you have an autofire joystick.

SEGA MEGADRIVE
For some nice presents in *Forgotten Worlds* shoot the water flowing from the top of the screen in level two.

SEGA MASTER SYSTEM
Continue flying *Thunderblade* by simultaneously pressing [Lower Right] and [Button 2] after you've lost your last life.

NINTENDO SUPER FAMICON
Have you managed to end your journey through *Super Mario World* or have you found some F-Zero cheats to get you into pole position? Let the rest of us in on your secrets. Send any Super Famicom tips and cheats into The Console Zone.

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NEW! - AMIGA PACK

Commodore A500 Flight Of Fantasy

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Commodore
AMIGA 500
Flight of Fantasy
RETALIATOR
DELUXE Paint II
ESCAPE FROM THE PLANET OF THE ROBOT MONSTERS
TENGEN
RAINBOW ISLANDS
ocean

A500 BATMAN PACK

Commodore AMIGA 500
BATMAN PACK

The Commodore A500 Batman Pack must surely rank as one of the most popular computer packs ever! The pack features the **Commodore Amiga 500 computer** with **mouse controller** and **TV modulator**, plus four top software titles. The software includes: **'Batman The Movie'** - Rid Gotham City of the cunning joker, in Ocean's top selling title based on the blockbuster Batman film; **New Zealand Story** - high quality conversion of the leading arcade game; **Interceptor** - Dogfight with two F-16's in this leading flight simulator; **Deluxe Paint II** - top quality Amiga graphics package which set the standard for others to follow. Return the coupon for further details.

PACK INCLUDES:

A500 Computer & Mouse	£399.99
A520 TV Modulator	£24.99
Batman The Movie	£24.95
New Zealand Story	£24.95
Interceptor	£24.95
Deluxe Paint II	£49.95
TOTAL RRP:	£549.78
Less Pack Saving:	£150.78
PACK PRICE:	**£399.00**

£399 INC VAT

AMIGA 2000

For the more serious or professional applications user, Commodore have a selection of systems based around the expandable Amiga 2000, at prices from £1295+VAT. The A2000 features a full 1Mb RAM (expandable to 9Mb), 9 system expansion slots, plus IBM compatibility with the use of PC-XT or PC-AT bridgeboards. Complete and return the coupon, putting a tick in the A2000 box, for details of A2000 computer systems.

£1295 +VAT= £1489.25

FLIGHT OF FANTASY

Flight of Fantasy is the very latest Amiga 500 pack from Commodore, featuring BRAND NEW software releases, to make this the most spectacular A500 pack ever! The pack features the Amiga 500 computer with mouse controller and TV modulator, as well as four top software titles. These include the following:

DELUXE PAINT II:

The high quality graphics program that set the standard for other Amiga art packages. Deluxe Paint II includes powerful, easy to use tools that bring out the artist in you. Create masterpieces, presentations, 3D perspectives or just doodle.

ESCAPE / ROBOT MONSTERS:

Here's something completely different - a science fiction story with comic book style graphics. Our heroes Jake and Duke are on the Planet X rescuing Humans who have been captured by the Robot Monsters and forced to create an evil Robot Army to DESTROY EARTH! Jake and Duke fight their way through hordes of evil Robots to help the Humans escape.

RAINBOW ISLANDS:

Slip on your magic shoes, practise throwing a rainbow and you're ready to go island hopping. From the Island of Doh to Monster Island, you will encounter Doh himself, stinging insects, lethal combat machines, mechanical assailants, the formidable beings of legend and folklore. Finally enter the world of darkness and its inhabitants.

F29 RETALIATOR:

The ultimate in flight simulation with a choice of two aircraft and four battle environments with dozens of different tactical missions. Aerial combat, strategic bombings, interactive ground based battles, seagoing carriers ... the list of features is endless. Real time cockpit displays, including 'true radar' enhance the realistic feel of this stunning simulation.

PACK INCLUDES:

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A520 TV Modulator	£24.99
Deluxe Paint II	£49.95
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Rainbow Islands	£24.95
F29 Retaliator	£24.95
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PACK PRICE:	**£399.00**

£399 INC VAT

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THE FULL STOCK RANGE: All of your Amiga requirements from one supplier.
FREE CATALOGUES: Will be mailed to you with offers and software/peripheral details.
PAYMENT: By cash, cheque and all major credit cards.
CREDIT PAYMENT TERMS: Silica are licensed credit brokers - return coupon for details.

Before you decide when to buy your new Amiga computer, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after buying your Amiga, when you may require additional peripherals or software, or help and advice with your new purchase. And, will the company you buy from contact you with details of new products? At Silica Shop, we ensure that you will have nothing to worry about. Silica have been established for over 12 years, and have an annual turnover of £13 million. With our unrivalled experience and expertise, we can now claim to meet our customers requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest Free literature and begin to experience the "Silica Shop Service".

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Address: ....

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Postcode: .... Tel: ....

Which computer(s), if any, do you own? .... A2000 ☐

E&OE - Advertised prices and specifications may change - please return the coupon for the latest information.

GOING UP IN THE

Your computer might work straight out of the box, but are you making the most of it? Investing a few pounds in some select upgrades could be money well spent...

When you buy your computer it works reasonably well, but nowhere near as efficiently as it could do with a little tweaking. There are add-ons you can buy which will transform the functionality of your machine, so it's well worth saving up to buy the extras. This week we look at some of the upgrades you can add to you machine and next week we will feature a run down on what peripherals are available and which are best for your machine. Watch out in the coming months for more in-depth articles on specific areas.

DRIVING FORCE

The most annoying thing about the ST and Amiga is the way their operating systems handle copying files; all that 'Copy files are you sure?' hitting enter, putting disk B back into drive A and the rest is enough to drive anyone to drink. There is a cost effective way around it; buy a second disk drive. Copying floppies only takes one mouse movement and a click on OK!

More importantly though, a second floppy disk doubles your on-line storage capacity. That means you can have a disk filled to the eyeballs with desk accessories and the main program you are using in one drive, and keep all your data files safe and sound on the other. Complex programs like desktop publishing applications will work much faster with only a fraction of the disk swapping required.

Fitting a second floppy disk is simplicity itself; you plug it in to the socket on the back and it becomes drive B on the Atari or DF1: on the Amiga automatically.

A second drive on a PC is so essential that hardly any machines don't have one filled as standard. The useful thing to add, however, is a drive of the other 'form factor' (that's 'size' to the non jargoneer). PCs come with two sizes of disk – 3.5-inch and 5.25-inch – each of which has two capacities. If you have one drive of each size it makes swapping disks between colleagues and friends much easier, and if your original floppy was a 360K 5.25-inch disk, it'll triple your storage capacity to boot.

The exact kind of drive you can fit depends on your computer, but as a guide:

Current drive	*You can add*
360K 5.25-inch	720K 3.5-inch
720K 3.5-inch	360K 5.25-inch
1.2Mb 5.25-inch	720K or 1.44Mb 3.5-inch
1.44Mb 3.5-inch	360K or 1.2Mb 5.25-inch

Obviously you can add a second drive of the kind you already have instead. Fitting a second drive to a PC is not as straightforward as the other 16-bits; you'll need a screwdriver and you'll need to do some fiddling with cables and switches. Depending on your machine you'll either need to run the Setup program or change the settings of some switches on the PC's motherboard. If your drive didn't come with instructions then don't panic, a future Circuit City will explain all.

HARDER STUFF

If a second floppy disk makes computing easier, a hard drive transforms it out of all recognition. Hard disks are big and fast; you can store all your programs and data on them and, best of all, it's all there ready and waiting when you switch the machine on – no grubbing about looking for floppies and copying files to RAM disks.

Unfortunately all is not sweetness and light; hard disks are expensive. This is particularly true of ST and Amiga disks where what is essentially the same hardware as the PC version can cost hundreds more. It's worth shopping around, however, as some of the third-party deals are now quite competitive.

With ST and Amiga disks the most important points to look for are the size (is it big enough to hold all your programs?) and whether the machine will automatically boot up off the hard disk or do you need a special floppy. In the PC world your choice is wider, but look at hard cards – hard disks on an expansion card which just plug in to the slots inside – if you want an easy life.

MONITORING THE SITUATION

When you first buy an ST or Amiga you probably start out using the living room telly as the screen, or, if you're lucky, a portable TV. This is just about OK for games – although you lose the sharpness of the graphics and the more subtle colours – but for 'serious' work involving text a TV is a recipe for headaches.

The solution is to buy a monitor; a dedicated screen designed to make your computer's output look its best. With an Amiga matters are relatively straightforward; if a monitor is advertised as Amiga compatible then it will be OK – the Commodore 1084 and Philips 8833 are two highly rated machines .

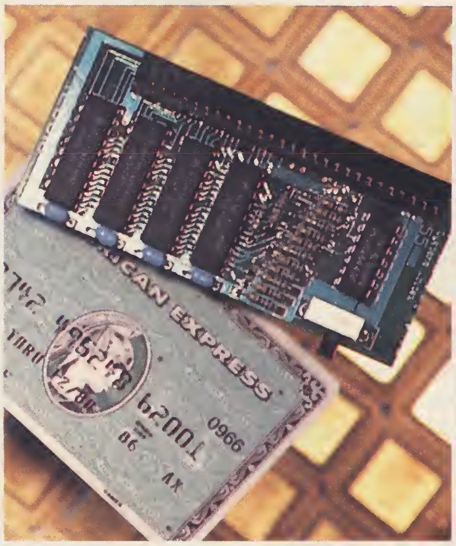
ST owners have an added complication; a monitor which will show colour low-res and medium-res screens won't show mono high-res ones and vice versa. If you want a monitor for games or graphics work then an Atari 1224 or one of the Amiga monitors will do the job nicely; if text and DTP is your forté you won't find a clearer, sharper, more pleasant to work on screen than the Atari 124 mono monitor.

If you have a PC then you'll already have a monitor, but you might want to look at upgrading it. There are several PC graphics standards and these days the best option is VGA (video graphics array to IBM – high-res colour to the rest of us). You can get away with EGA (medium-res colour) or Hercules (high-res mono), but VGA is definitely the one to have.

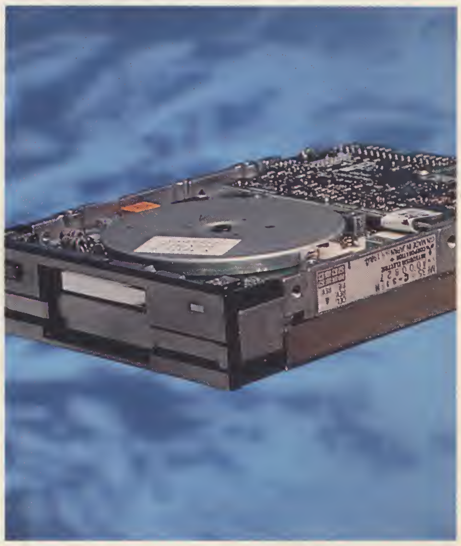
If you want to upgrade to VGA you'll obviously need a new monitor, but you'll also need a new graphics adapter card inside the PC to drive it. On the whole that shouldn't be a problem; you pull out the old one and slot in the new and (on an AT) alter the Setup, but some older machines you may need to flick a switch

PHILIPS
PHILIPS

• The 8833 (recently updated to the Mark II) is one of the standard ST and Amiga monitors.



• Amiga memory expansion boards are tiny and tuck into the slot under the A500.



• You can fit a bare drive to a PC to add extra storage; only a little cabling is needed.

WORLD

and some Amstrads won't let you do it at all as their graphics adapters are built in.

MICE MAGIC

These days you need a mouse to run almost any program. This has always been the case with the Amiga and ST, but it's now true of the PC as well. Strange then that PC mice are, as a rule, great, while the standard ST and Amiga versions are virtually unusable. If you intend to do serious work with an ST or Amiga then consider a replacement mouse. There are several models on offer, some with gimmicks like the infra-red cordless mouse. One well thought-of brand is Naksha, which is a straight plug-in replacement.

If you have a mouseless PC then the models from Genius are good and extremely cheap, as are the A4 mice. These attach to the serial port of your machine, so if you don't have a spare one – say you want to use it for a printer or modem – you'll have to add one with an expansion card.

MORE MEMORY

The basic models of 16-bit computer come with around half a megabyte of memory (512K for the ST or Amiga, normally 640K for a PC). Many modern programs simply won't run in that amount of memory; this is particularly true of the Amiga because its multi-tasking operating system allows you to run several programs at once, but only if you have the memory to do it. Any computer will benefit from having a whole megabyte of RAM, and some applications only really begin to fly with four or five.

Upgrading an Amiga is simplicity itself; buy an upgrade board and slot it into the little trapdoor under the A500; job done, retire to the pub for a well-earned pint. STs can be more technical depending on the model. With some STEs it is just a matter of adding chips into sockets, but others require soldering and other unpleasantnesses. A dealer will usually be happy to do the job for you.

PC extra memory is an extremely complex subject to which whole books could be devoted. Getting the physical memory into the machine isn't difficult, but getting programs to see it is. Once again this will be the subject of an article in a forthcoming *Express*.

SOME TYPICAL PRICES

AMIGA		ATARI ST		PC CLONE	
Second floppy	£55-£70	Second floppy	£65-£73	Second floppy	£59
20Mb Hard disk	£279-£369	30Mb Hard disk	£439-£449	Hard disk	£185
Colour monitor	£199-£269	Colour monitor	£199-£269	Colour monitor	£270-£281
Mouse	£19-£29	Mono monitor	£110	Mouse	£38
Extra 512K memory	£30-39	Mouse	£18-£35	Extra 2Mb memory card	£93 (no RAM included)
Joystick	£5-£13	Extra 512K memory	£59-£70		
		Joystick	£5-£13	Joystick card	£25

These prices are a range from advertisements in just one issue of *Shopping Express*, so you can see it pays to read the ads carefully! Manufacturers recommended prices may well be much higher than these.

PURE JOY

Joysticks are the one add on where the supplied versions with the ST and Amiga are adequate. If you don't like the styling, however, changing it for a new one is a simple matter of unplugging one and slotting in another.

As ever, PC owners have to do it the hard way. Standard PCs don't have joystick ports so you have to buy an expansion card and plug it in. You can buy multi-function cards with serial ports, printer ports, clocks and joysticks all on one board. The other difficulty is that PCs use a different kind of joystick to the ST and Amiga. Called 'analogue' joysticks they work on a different principle to the simple 8-way 'digital' models. There are various pros and cons to applicable both, but since you don't get the choice of which kind you use they're a bit irrelevant.

BUILDING IT UP

As you can see, buying a computer has only started your expenditure. Getting the machine up to a fully-working specification is only the beginning; then you can start thinking about other add-ons and peripherals. How about a printer? Or a sound sampler? A MIDI interface? Or a scanner? And of course you haven't even begun to buy the software yet.

Computing can be a full-time hobby if you want it to be, so why not have fun getting your machine up to the top flight spec. ■

JARGON BOX

MOTHERBOARD: the green circuit board which holds most of the computers chips.
HARD DISK: a fast disk which can store as much as dozens of floppy disks.
RAM DISK: a way of using memory as a second disk drive to speed up programs.
EXPANSION CARD: extra circuitry which plugs into special sockets (slots) inside a PC to give it extra functions
GRAPHICS ADAPTER: electronics which allows a computer to use a monitor.
MOUSE: pointing device which allows the computer to be worked without the keyboard.
SERIAL PORT: socket for attaching external devices to a computer.
MODEM: machine which allows data to be sent and received via a phone line.
MEGABYTE: a unit of memory which can store 1,048,576 characters of information.

Have you upgraded your machine in an outrageous way? Then we want to hear about it. Send a photo and details to: Outrageous Computers, New Computer Express, *30 Monmouth Street, Bath BA1 2BW. Enclose a SAE if you want the picture back.*

Naksha
Naksha
Naksha

• *It's worth thinking about replacing the standard ST or Amiga mouse with a smoother, more precise model, like this Naksha.*

ATARI SC1224
ATARI

• *The 1224 is a medium-res colour monitor with the advantage of matching the styling of the ST.*

• *A porkier joystick can improve your gameplay, but if you have a PC you'll need an expansion card too.*

TECH TIPS

Does your PC keep packing up? Is your Amiga less than friendly? Would your ST try the patience of a saint? Write to Keith Pomfret's Tech Tips and we'll soon see you right. Send your sorry stories to Tech Tips, Beauford Place, 30 Monmouth Street, Bath BA1 2BW.

■ HELP! ST Drives

I'm afraid I have a rather old 520 ST with a single-sided drive, and I want to upgrade it. I use the computer for both games and serious use (homework, DTP, etc), so a double-sided drive would come in handy, but I also want to keep my internal single-sided drive in use.

The obvious solution would be to buy an external double-sided drive, except that many double-sided games disks only boot from drive A – so I want to switch the drives around. Are there any external drives made where you can take the original drive out and swap it for the single-sided drive inside your ST? Is it true that you can make your ST think that the drives are the other way round? Please give details if this is true. Also, can hardware disk copiers such as Blitz (for backing up only PD and personal files of course) work in conjunction with the switch? By the way, yours is the best (and surely cheapest) computer mag in Smiths.

Simon Rippon, Basildon, Essex.

The drive number is determined by a switch or link in the disk drive. Most drives can be set to at least 0 and 1 and more often 0, 1, 2, and 3. Logically, if you change the switch or link of the internal drive to 1 and the external drive to 0, your elderly ST will think that the external drive is internal and vice versa. It is indeed possible to switch drives. The way this is wired depends upon which drive you use. In a simple installation, where both drives are changed using links, it's a simple matter of removing the links, soldering wires on to them and terminating both sets of wires with a switch that simultaneously changes both drives. In an installation where the drive selection is by switches or soldered links, you'll need to either risk the job yourself or find a competent computer repairer to do it for you.

Either way, if it means a new drive, you can kiss your warranty goodbye.

■ HELP! Spectrum interface

I have a 5.25-inch disk drive and Technology Research Limited 'B Disk' interface which was purchased (in 1985?) for use with a 48K Spectrum. These have been gathering dust at the back of a cupboard for a long time but, for nostalgia's sake, I have recently resurrected them.

This interface incorporates a snapshot button which saves the content of RAM to disk. Although I still have the interface manual, the command sequence for re-loading snapshot images was supplied on a duplicated manual supplement which, despite having turned the house upside down, I cannot find. I have racked my brains to remember the sequence but without any success.

Technology Research Limited appears to have vanished, at any rate it is no longer at its original address (Unit 18, Central Trading Estate, Staines, Middlesex). If you have no information, the serial number of the interface is 002944 so I presume someone else out there must have one and be able to confirm the commands necessary.

Simon Longland, Dingleton, Melrose, Scotland.

I have to hold my hand up and admit that I don't own a Spectrum or the wondrous piece of kit that's giving you problems. There were at the last count a squillion Spectrum owners reading this mag, so I'm sure that someone somewhere will send me details to pass on. The other alternatives are to go to an enthusiasts' computer show (such as the All Formats show or similar) where someone will know what you want or be selling the document in question, or you could try other companies that have made Spectrum peripherals.

Were you a somewhat smarter cookie you could have sent in the form with a free reader advert and would, by now, have received about three thousand four hundred and twelve replies.

■ HELP! STD stuff

At work, we use a natty little program on the PC that will give you the STD code if you type in a place name, and a place name if you type in the STD code. I've tried all of our local computer shops but they can't find anything similar for the Amiga. I even travelled to the last All Formats show in the hope that there might be something there but alas, no luck. Can you help?

S Kennedy, Preston, Lancs.

There is hope and it's closer than you think. Get on a Fishwick 111 bus at Preston bus station and ask the driver to put you off in Leyland. Sector Software (organiser of the Northern Computer Show) does the software you're looking for. It's called *STD Index* and is available for ST, QL, Amiga and PC and costs a mere £14. If you don't want to venture out on the bus, you could give Sector a ring on 0772 452414. The *STD International Index* is due any day now and will find you that elusive code for Liverpool, Leipzig or Leningrad.

■ TIP! DIY STD

I couldn't find an STD codebreaker for the Amiga or ST so I typed all of the 7,000 plus codes and locations in (I didn't really, I modemed the data file from my dad's PC codebreaker). I loaded it into *Protext* and used the 'find' option to find the appropriate code. It may not be as quick as the pop-down PC ones but it'll do for now.

William Stevens, Twickenham.

You should check who owns the copyright on the data before you lift text files from other programs, but if the copyright holder (I think it's Telecom) doesn't mind the borrowing of its precious data, it's a good idea. You may note from the last letter that someone's got round to an Amiga and STD code fettler though.

■ TIP! Christmas turkey

My wife (bless her cotton socks) bought me a VGA monitor for my PC for Christmas. After listening to my incessant whining about the horrid old green jobbie, she went to our local computer shop and bought 'the best PC monitor they'd got'.

■ HELP! Psioning on

A Psion Organiser was the only computer that I could afford when I wanted to join the computer revolution. It is a fine little machine and I use it as an organiser all of the time. There must be more uses for it. I see surveyors using it, I see assistants in Marks and Sparks using it. What else can I use it for? Can I log on to a bulletin board with it?

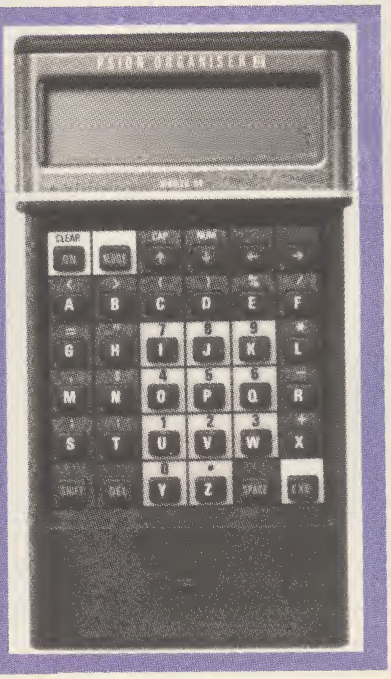
Frank Goodward, Cros de Cagnes, Alpes Maritimes, France.

We don't get asked about the Psion much but a delve into the deeper boxes revealed a pristine pair of books guaranteed to warm the cockles of the heart of Psionists everywhere.

Psion Organiser Deciphered is a beginners' guide to the organiser covering the full range of LZ, LZ64, CM and XP models. *Psion Organiser Comms Handbook* is an in depth 212 pages on the vagaries of comms and how it figures in the life of Psion. Both are published by Kuma. I don't know how easy it will be for you to buy the books in your nearest town So here are the details you may need:

Psion Organiser Deciphered	ISBN 0-7457-0139-6	£12.95
Psion Organiser Comms Handbook	ISBN 0-7457-0154-X	£14.95

You could ring Kuma direct. The number from France is 19-44-734-844335. For those of us who still drive on the left, 0734 844335 is the appropriate phone number.



I don't understand computers but I can tell that the 15-pin plug on the monitor won't fit anywhere on the back of the PC (which is a Compu-Add). An acquaintance at the local computer club says that as there's nowhere to plug it, the only option is to do a straight swap for his EGA monitor which he has demonstrated will run on my machine without modification. Is he being helpful? Is he trying to stitch me up? I'd hate to be ungrateful for a good turn but I can't help feeling that there's something a little slimy about him. Please don't print my name in case he's got as good taste as me in weekly magazines.

What you need (assuming that it didn't come with the monitor) is a VGA card. This fits in one of the expansion slots of your PC and has a 15 pin connector for the monitor. If you've several boards in the expansion slots of your PC you could find that the VGA card will argue with existing cards over its place in the scheme of things. This can be solved by setting links or dip switches on the board to avoid card clashes.

Once you've kicked your mate and installed your card, you may find that the display of some of your programs isn't any different in resolution (although you will have glorious colour at last). This could mean either that your software wasn't written to take advantage of VGA or that it hasn't been configured for VGA.

If it hasn't been written to work with VGA, tough. If it hasn't been configured, you may be able to do this on the fly or you may have to re-install the programs. The appropriate manuals will give you the details.

■ HELP! AmigasDOS

September saw an Amiga land in my study as a belated birthday present. The games that came with it were fun and I have seen off a few waves of bad guys. I decided to invest in some serious software and heavyweight reading. Friends recommend *Protext* 4.2 as a word processor, *Superbase* as a database and *DPaint* as an art package. I want to know if these pieces of software meet with your approval.

I use a Philips monitor, have ordered an extra drive and 512K upgrade and hope to get a good joystick soon.

Now to books. Friends have suggested books on most subjects except the operating system. There everyone seems to draw a blank.

The Amiga disk operating system is a mystery to me and I can't decide which book to use a a reference. The City Bookshop has several but don't admit to knowing which is best.

Ken Whiteway, Lancaster, Lancs.

Your choice of software meets with approval. If you're upgrading to 1Mb though, you'll be able to run the whizzier and fuller featured *Protext* V5.

The book you are looking for may well be *Mastering AmigaDOS 2* which covers versions 1.2, 1.3, and 2.0, of the Amiga's quirky operating system. The book is written by Mark Smiddy and takes each of the operating system commands and explains its use in simple or complicated command chains.

The book is completed by some info on viruses and other necessary knowledge for Amigaphiles. Now the important bit. ISBN 1-873308-01-9, published by BSB (0727 41243) all for £17.95!

■ HELP! CP/M BBS

There used to be loads of bulletin boards running on CP/M machines. Now all I can find are Amigas, STs and PCs. All of these new BBSs only seem to cater for 16-bit users.

I wonder if you can remember any BBS software that will run on an 8512 (don't laugh). I have an Amstrad 2400 modem and serial port and a hard drive is on the way. I already use MEX (a PD comms utility) to log on but I'd rather have a BBS of my own.

Janice Taplow, Sheffield, Yorks.

I had to cut the above letter from its original 3,422 words to a more manageable few dozen. You have a choice of three kinds of software that will turn your PCW into a BBS (bulletin board):

1) Bulldog. This is pretty recent and was written by Blane Bramble who is still within kicking distance for help. The Owl Service started off as a Bulldog board. It isn't free but it's supposed to be pretty good value.

2) XRAS. Avoid this one. It has all the stability of a drunk on roller skates and will cause you nothing but hassle. I struggled for months to try to get my own BBS to work with XRAS. XRAS is PD so you can get it from any good public domain library specialising in CP/M.

3) ROS (Remote Operating System) This one stood the test of time and eventually took the place of XRAS on my system. As well as being a fully functioned BBS, it is well supported by sysops who truly understood it. Aspects used to run ROS on an Amstrad 6128 and sysop Dave Gorski is an acknowledged expert and tweaker of ROS. Again ROS is PD so can be obtained from PD libraries.

The WACCI PD library can supply XRAS or ROS but I'm not sure where Bulldog is available from. Try logging on to the Owl Service (Telephone: 0532 605876) and leaving a message for sysop Malcolm Arnold

■ HELP! Projects for all

You published the review of a Tandy product called 130 Projects or something of that ilk. It was very interesting and I'm planning to have a go at one shortly. It seems like an easy way to learn about circuits, but leaves me in a bit of a quandary. The kit you covered looked a bit too complex for the kids – but too simple for me. We used to do this sort of bread-board circuit at school and I was pretty good at it! Is there a simpler one for the kids (twins aged eight) and a more complicated one for me? I liked the idea of a device to detect three levels of bathwater.

Jo Trevethick, Saltash, Cornwall.

Tandy in Bath hosts a veritable cornucopia of projects for all ages. A smaller 30-project version of the project suitable for those of eight years plus will probably suit the youngsters. For your own consumption there's a 200-project kit on a special. Here are the kits and prices:

200 projects, £29.95, age 14 plus
130 projects, £29.95, age 10 plus
60 projects, £19.95, age 10 plus
30 projects, £12.95, age eight plus
AM short wave project kit, £12.95, age eight plus
AM/FM aircraft monitor kit, £12.95, age eight plus
Crystal Radio kit, £4.95, age eight plus

Remember though that although these project kits are suitable for children of the ages described, they must always work under supervision tackling scientific projects.

Tandy is on 021-556 6101.

■ TIP! Protext power

If you want to turn someone with *Protext* into a human pyrotechnic, tell them to hit the escape key and type 'panic'. They should then hit the carriage return and you should beat a hasty retreat. It works best if you pick someone who's just typed about 10,000 words into a document but hasn't saved it.

The trick with this one is to pick someone who runs a fraction slower than you. This way you'll get the fun of the practical joke and the fun of the chase without the hassle of the beating that will surely ensue. If you're a real clever sod, an accomplice will have nipped in and either restored the machine to its normal self with the document saved or pulled the plug. This depends on how much of a sadist you are.

Glenn (Protext) Granby, King's Lynn

You've picked the most well documented feature of Protext and it isn't exactly news here at *Express* where we only deal with the present, not the past. I understand from Arnor that the tweak you describe is a feature, not a bug.

If, however, you find any real bugs in any programs do let us know. By the way, you forgot to say how you find out if someone can run faster than you. ■

■ HELP! Star performance

I am planning to buy a 24-pin colour printer for use with my 1040ST and have had my heart set on an Epson LQ860 for some time, although I have only ever seen magazines mention it in passing. I see in this month's *ST Format* that Tim Smith thinks the new colour Star LC24-200 24-pin is pretty nifty, but somehow this doesn't fill me with too much confidence.

Could you possible tell me what you know about the LQ860? The cheapest I've seen the printers advertised for is £270 for the Star and £550 for the Epson; is the LQ860 really that much better?

I read that I had won a Virgin Games' Edition One compilation but I haven't heard anything since. Seeing as the last time I won anything in *Express* the excuse for a long delay was that there was nothing to pack the prizes in, I can't wait to hear the official line this time. Can you please wag your finger at whoever's responsible?

Bryan Kennerley, Rhyl, Clwyd.

Both of the printers you mention are able to do the job you require and although I haven't road tested either, colleagues on other magazines here at Future Publishing seem to concur: if you're on a strict budget go for the Star, if money's no object the results from the Epson are worth the extra folding stuff. One very important thing to remember if you're buying a printer is that it is only as good as the printer driver software available in the applications that you intend to run.

Before you spend hundreds of brass Majors on the output device of your dreams, check that it can be driven by your software. This could make the decision for you. It wouldn't be much fun to spend the holiday money on the whizziest printer in town only to find out that it won't work with your favourite art or design package.

To answer your other question, Smiffy is the villain of the piece again. While we weren't looking, he sloped off to the good old US of A to watch public service TV. We had him arrested, deported and sent back, but in the ensuing time a slight backlog built up. We've fed him Harpic and Bloo and as well as sending him clean round the bend, it has started to remove the blockage. Have patience and ye shall receive.(If you don't, let us know and we'll deport him to the colonies again.)

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AMIGA

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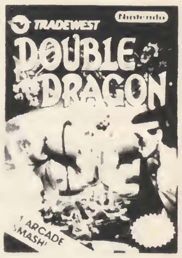

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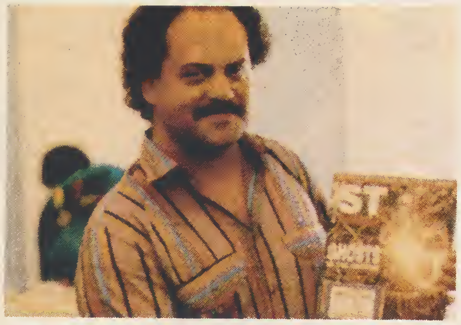

• *Jack Tramiel left Commodore in 1983 and went on to take the helm of Atari. Under his guidance the ST was developed and has gone from strength to strength ever since.*

ST BASICS

So you've just bought an ST? Mark Higham, editor of ST Format magazine, introduces the first in a ten part series covering everything you need to know about the ST.

Congratulations, buying your ST was one of the best decisions you ever made, but what is almost certain is that you've yet to explore even a fraction of your machine's full potential. If you bought your ST for games for example, that's fine – yet there are at least a dozen other areas where your ST can help out and you don't have to be rolling in money or a programming whizzkid to take advantage of them. If, on the other hand, you think games are for kids and the ST is a serious computer, then you're missing out on a whole lot of fun.

To help you explore new and thrilling avenues of development, over the next ten weeks we will be giving you an insight into how you can exploit your powerful machine. There's no other home computer which offers so much in terms of graphics, sound, processing power and supported software at an affordable price so you can't afford to miss it.

Already the ST is the ultimate music computer. ST music programs from companies such as C-Lab and Steinberg are now used in 80 per cent of professional music studios with hit bands like Madonna, Peter Gabriel, Queen, Soul II Soul, Betty Boo and Stock, Aitken and Waterman's Hit Factory exploiting them. On *Top of the Pops* most weeks every single act appearing has used STs at some stage in making their record.

With the arrival of *Calamus* and *Timeworks DTP*, the ST is a big contender in the professional DTP market. In fact, it's already used to produce at least one newsstand magazine as well as hundreds of fanzines, news letters, posters, reports and company newspapers.

• *In its first days the ST was a confused collection of boxes – who could have imagined it would become such a sexy machine?*

In graphics there are drawing programs enabling you to use 4,096 colours on screen at once. If you find that restrictive there's even a plug-in board you can buy which extends this to a staggering 16 million colours. You can invest in animation programs which enable you to write the sequel to *TRON* or re-design the Ferrari Testarossa.

But it doesn't stop here. The ST is a winner in the business world where databases, spreadsheets and accounting programs enable big and small businesses alike to run as smooth as clockwork. In education it's already used throughout schools up and down the country. And there are hosts of letter writers and authors tapping their ideas into one of the many wordprocessors available. What more could you want?

In the next issue of *Express* you can discover the vast range word-processing and DTP packages available for your ST. In the eight issues which follow we'll also be covering graphics programs, video applications, digitisers, scanners, business programs. music, disk drives, monitors, printers and add-ons like emulators.

FROM LITTLE ACORNS

The ST was first shown to the general public at the American CES show way back in 1985. It was a primitive machine in those days, coming as it did with a separate disk drive and power supply unit. Though it took a while to get off the ground, once an affordable price tag was fixed it just grew and grew and grew. In its short lifetime the ST has come such a long way that you could be forgiven for thinking it was the first machine ever to come out of the Atari stable but the company's history goes much further back.

It was in late '71 that Atari was first formed. Nolan Bushnell, then a product manager for an arcade-game manufacturer, left his job to start his own company called Syzgy. He spotted potential in an arcade game called *Pong* and went on to market it but Syzgy didn't last long because another firm had already registered the name, so Atari was set up instead. 1973 saw the *Pong* machine become the biggest arcade success story of all time and it got Atari on its feet. By the end of the financial year Atari had clocked $3.2 million in sales.

Atari was big but it wanted to get bigger and for this they needed an injection of cash. Warner Communications appeared on the scene and willingly parted with $28 million in August '76. After that the VCS 400/800 home computers were launched. In '79 Bushnell resigned after Warner blamed him for the failure of the VCS machine. By 1982 Atari hit an all-time high with sales in excess of $2 billion, but a year later the more keenly priced VIC 20 and C64 dominated the home computer scene and turned Atari's big high into its biggest ever low.

Commodore's success was down to its president, Jack "business is war" Tramiel. However, Commodore's chairman, Irving Gould disapproved of the way Jack put his sons in executive positions throughout the company and on Friday 13th 1983 Jack waved goodbye to Commodore. Over the next few months Atari got in big trouble to the tune of $538 million and in a desperate bid to rescue the company, Warner approached Jack to take over Atari.

Previously, someone at Atari commissioned Amiga Inc. to work on some custom chips, intended to be used in the ST. But Amiga Inc. became unhappy with the way Atari handled the affair and refunded its money so it took its developments to Commodore instead. These developments eventually turned out to be the Amiga.

Atari didn't want to get left behind and started work on their own 68000-based machine. Key members of Commodore began to drift to the Atari camp and within a year the ST was developed.

When it started out the ST was a muddled collection of boxes and even the operating system had to be loaded from disk. Within a few months the ST made it across the Atlantic and was shown at the PCW show. A year later we could all lay our hands on this new "wonder machine". However, with a price tag of £750 for the basic model few people wanted it. Within a short time the price of the ST dropped to £400 and four variations appeared.

Atari has declared its ambition to become a company with a billion dollar turnover by 1995 and if it is to stand even the remotest chance of success, the ST must remain successful. As it continues to march into homes around the world it's being used for an increasingly diverse range of uses. The result? Ever better software, ever wider applications. With the launch of the STE we're guaranteed that programmers will continue to develop new and astounding hardware and software to exploit fully the potential of the ST range. ■

Mark Higham is editor of ST Format *magazine. These articles are reprinted from his book, Get the most out of your ST, available from Future Publishing Ltd, The Old Barn, Somerton TA11 7BR. Price £9.95.*

MAKING THE MOST

AMIGA BASICS

Damien Noonan, editor of Amiga Format magazine, introduces the beginner to every aspect of the Amiga in this easy to read ten part series.

This series is intended to introduce the beginner to every aspect of the Amiga in ten easy stages. The first step, this week, is to take a quick look at the Amiga's strange and interesting history to give new users a brief introduction to the way their machine works. Over the next nine weeks, we'll be covering word processing and DTP, graphics, video, digitisers, scanners, databases, spreadsheets and accounts, music, hardware (disk drives, RAM, etc) with general advice and specific recommendations as to what to buy.

IN THE BEGINNING...

The world's most advanced home computer came from humble origins. It was conceived as the best games console ever, developed by a firm called Hi-Toro and was nearly put into production by Atari. The name, Spanish for girlfriend, was a code to keep the project secret when the developers were talking about it in bars. At its launch at the Chicago CES in 1985, Andy Warhol and Debbie Harry showed off its capabilities. There was one catchphrase that said it all...

"Only the Amiga makes it possible".

Debbie Harry sang along to the sounds emanating from the machine and modelled for Warhol, who was there to demonstrate the graphic power of the Amiga and continued to use the machine throughout his life. It was a glamorous beginning for a mere computer.

CALIFORNIA DREAMIN'

California, 1984. Hi-Toro was a young Silicon Valley company, working on a world-beating console initially called Lorraine. Before long, they decided to change the name of the company to Amiga. Amiga? Lorraine? Well, at least no-one would know what they were talking about in bars.

At the core of Amiga's team were Jay Miner and Dave Morse. Jay was a chip designer, and before Amiga he designed the chips in the VCS and Atari 800 computers, plus a variety of medical and scientific projects. Dave Morse started with Tonka Toys and joined to market Lorraine to an expectant American public. After Jay and Dave came RJ Mical, software engineer. RJ had been working on games with *Defender* creators Williams. RJ was head-hunted by Amiga to design Intuition, part of the programming environment of the Amiga: indeed the bit that handled the Workbench.

To keep the real project secret they made a range of joysticks and used the revenue from them as a bit of support for the Lorraine. The joysticks Amiga made were all weird and Californian: like the Joyboard, for example. This was a board with contacts at each corner which the player stood on, for playing surfing games.

The story goes that one of the popular games at Amiga was to sit cross-legged on the Joyboard and run a special feedback program which tested how mellow you were by how still you sat. Meditating on the Joyboard was a popular way to relax after the prototype Amiga crashed, and so the famous Guru Meditation errors were named accordingly. Sadly, in new machines, the Guru name is no longer there when the machine crashes.

Similarly, if you ever have cause to take your Amiga 500 apart and look at the circuit board, you will find the words 'B52 – Rock Lobster' etched on the board. Strange people, these Californians!

A COMPUTER GROWS

Unbeknown to the Amiga management, a lot of 'options' had been added in the console's development, like a disk drive, printer ports and a keyboard. The prototype, called Zorro, running on the Sage 68000 machines, was no games console. The circuit boards, later to be compressed onto the three custom chips Paula, Agnus and Denise, became more complex as the project wore on. It had somehow mutated into a viable computer.

• *Humble origins for the world's most advanced home computer, the Amiga.*

But Amiga had problems from the start. In order to interest companies in a machine, you had to have one to show them. And you couldn't afford to build one until you got someone interested. Dave Morse remortgaged his house to get the firm through some sticky spots. They took out stands at computer shows to secretly show the machine to software houses, and had all the hardware blow up days before.

Against the odds, the demo machine wowed enough people at the Chicago CES show in June 1984 to keep the project going. But they had to find a serious sponsor, who would either help them or (and this was the way it turned out) buy the machine out. Everyone was approached, including Sony, Hewlett Packard, Philips, even Apple Computers! No one was interested. Finally Atari showed an interest.

At the last minute, when Tramiel was about to buy Amiga out and use it as a stick to beat Commodore with, Commodore themselves called Dave Morse and bought it first.

CBM set aside a new company inside itself, Commodore-Amiga, to house the machine. It was around then that the machine took on the name of its creators. Commodore put millions into its development and the machine grew into a slim console with a detached keyboard, on top of which sat the stereo monitor. The Amiga was born...

WHY IS THE AMIGA SO GOOD?

The 'architecture' of a machine describes the physical way the various chips and components are arranged on the printed circuit board. The PCB, essentially, *is* the computer: All the other stuff that makes an Amiga is simply a disk drive unit, a keyboard and a load of plastic for the casing. Architecture also implies a conceptual view of the way in which the various components combine to control the way in which the computer works.

So why is the Amiga's architecture superior? Basically the difference lies in the use of custom chips. An ordinary computer depends almost entirely on the Central Processing Unit, or CPU. For example, the Atari ST uses the same CPU as the Amiga, but the ST has no custom chips.

The CPU is the main chip that handles all the processing of information: it is also the chip that defines a computer as 16-bit, 8-bit, etc. These bit numbers describe the size of the 'data bus', which is the vital holding area through which all information must pass when a program is running.

The size of the bus and the speed at which information can be passed through it define the speed of operation of the computer. The more things the computer is asked to do, the more tasks need to share processor time: and the more the whole business slows down. This is big problem with multi-tasking: different tasks, although they appear to be running concurrently, actually they have to take turns to use processor time.

The Amiga does not rely entirely on the CPU: so it doesn't suffer from all the attendant problems. The independent functioning of the Amiga's unique custom chips takes much of the weight off the CPU and allows more speed and power to be applied to graphics and sound. It also frees the CPU to take on the challenge of multi-tasking, unique in a home computer. A remarkable performance by the young machine from California. ■

Damien Noonan is editor of Amiga Format *magazine. These articles are reprinted from his book,* Get the Most Out of Your Amiga, *available from Future Publishing Ltd, The Old Barn, Somerton TA11 7BR. It costs a very reasonable £9.95.*

In the next issue of *Express* you can discover the vast range word-processing and DTP packages available for your Amiga. In the nine issues which follow we'll also be covering graphics programs, video applications, digitisers, scanners, business programs. music, disk drives, monitors, printers and add-ons like emulators.

THE ATARI ABC

Now, there's a PC-AT compatible that not only solves problems like other AT compatibles, it also solves the one problem that its predecessors have created ... affordability.

Silica Systems are pleased to present the new Atari ABC. The ABC is a 286 AT compatible that runs at over 5 times the performance of the IBM XT. This is achieved by combining the power and speed of a 16-bit 286 processor, with Atari Corp's development experience and engineering capabilities, which use the very latest in design technology. However, the Atari ABC's are available at 'XT prices' and many XT owners will wonder why they paid more, but got less!

The ABC is a reliable, high performance computer, built to exceptionally rigorous standards. It is well designed, to a state of the art specification, maintaining maximum expansion capability for the future. This includes up to 4Mb of RAM and 3 AT expansion slots. Plus, unusually for a PC at this price, the ABC has the ability to install two or three extra drives, with the cabling already inside the CPU.

The ABC has a host of impressive features, all built-in as standard, encouraging simple installation and ease of use. In addition, the ABC's small footprint and quiet operating, mean that you will notice it less on your desk than other PC's. Except, of course, when you begin to take advantage of its AT power.

At its remarkably low price point, the ABC is ideally suited for home, office and educational use and will take full advantage of the vast range of PC compatible software. And, with 12 months FREE on-site maintenance (8 hour response), you can rest assured that your ABC will be fully supported.

The ABC is the latest addition to a comprehensive range of both 286 (8Mhz or 12Mhz) and 386 (16Mhz and 20Mhz) PC's, from the Business Systems Division of Atari Corp. Atari's PC range offers an unsurpassed combination of reliability, compatibility and expandability, with unique features like Atari's 44Mb removable hard disk on their PC4. Return the coupon NOW for further details of the complete range of PC products from Atari's Business Systems Division.

ABC TURBO
AVAILABLE: JUNE 90

To put the ABC even further ahead of the competition, we have introduced a special 'Turbo' version, which includes a super fast RLL hard disk controller to increase the data transfer rate from 150KBytes/s to 800KBytes/s, with a performance index of 4.801. Plus! to provide exceptional graphics with an outstanding colour resolution of up to 1024×768, we have included a Super VGA graphics adaptor and a 14" VGA colour monitor (which also supports 1024×768 resolution), all for an additional price of only £300. Check the ABC Turbo against the competition, at only £1299 (+VAT) with 30Mb hard disk, Super VGA colour graphics capabilities, plus 12 months on-site maintenance, it offers unbeatable value.

LOW PRICE - HIGH SPEC!

CPU+MOTHERBOARD

- 8Mhz 80286 16-bit CPU
- Landmark Speed = 10.3Mhz, Norton SI Test = 9.0
- Latest NEAT (New Enhanced AT) technology chip set
- Has user selectable bus, DMA speeds & wait states
- Programmable to operate at 0 or 1 wait states
- 640K RAM base memory (expandable)
- Motherboard expandable to 4Mb RAM memory
- Real time clock with battery back-up
- Full 16-bit data line capability
- Socket for 80287-8 numeric Co-Processor
- 3 16-bit AT expansion slots (max)

DISK

- 32Mb RLL hard disk - 150KBytes/s transfer - 60ms access
- Fast disk controller - 800KBytes/s transfer - *Turbo version*
- 1.44Mb built-in 3½" floppy disk drive
- Space for two 5¼" and two 3½" drives (max)

I/O

- Parallel port built-in (25-pin Centronics)
- Serial port built-in (9-pin RS-232)
- Mouse controller port built-in (9-pin serial)

GRAPHICS

- Super VGA video graphics controller - *512K - Turbo vers*
- Super VGA: 256 colours in 800×600 res - *Turbo vers*
- EGA video graphics controller built-in
- EGA: 16 colours available from a palette of 64
- EGA: 256K of dedicated Video RAM built-in
- MDA, CGA and Hercules graphics controller built-in

PHYSICAL

- Low noise operation
- Ergonomic small footprint (38cm×41cm×15cm)
- Keyboard - 102 key enhanced AT (12 function keys)
- Keyboard - has 2 position height adjusters

PLUS!

- Fully OS/2 compatible (requires 4Mb RAM)
- Supports Industry Standard Networks
- MS-DOS 3.3 with GW BASIC 3.22
- 12 Months FREE on-site maintenance included

286 AT

WITH 30Mb HARD DISK & EGA MONITOR - £899

FREE! - ON-SITE MAINTENANCE
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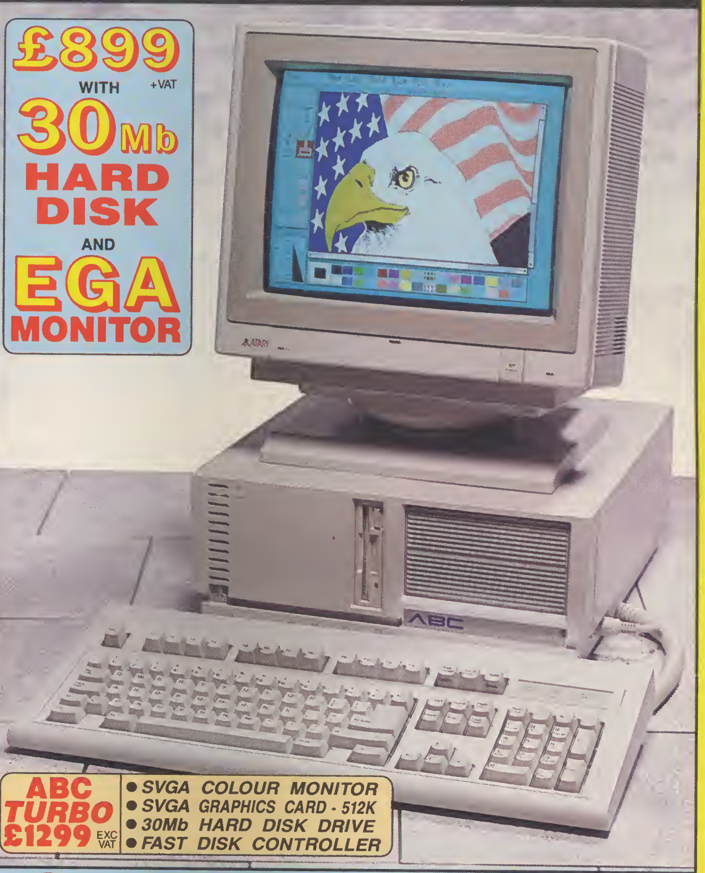

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EGA MONITOR

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- *SVGA GRAPHICS CARD - 512K*
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- *FAST DISK CONTROLLER*

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ATARI

	3½" FLOPPY DRIVE NO HARD DRIVE	3½" FLOPPY DRIVE + 30Mb HARD DRIVE
NO MONITOR	**£599** +VAT = £688.85	**£799** +VAT = £918.85
+ EGA MONO	**£699** +VAT = £803.85	**£899** +VAT = £1033.85
+ EGA COLOUR	**£799** +VAT = £918.85	**£999** +VAT = £1148.85
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PRICE MATCH: We normally match competitors on a "Same product - Same price" basis.
SHOWROOMS: Demonstration and training facilities at our London & Sidcup branches.
THE FULL STOCK RANGE: All of your Atari PC requirements from one supplier.
FREE CATALOGUES: Will be mailed to you with offers and software/peripheral details.
PAYMENT: Cash/cheque/credit card/credit - we are licensed credit brokers - details on request.

Before you decide when to buy your new Atari ABC, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after buying your ABC, when you may require additional peripherals or software, or help and advice with your new purchase. And, will the company you buy from contact you with details of new ABC products? At Silica Systems, we ensure that you will have nothing to worry about. Silica Systems is a new division of Silica Shop, the UK's leading Atari specialists. This new division has been established to provide a service to the more serious home user, as well as to business and education purchasers. Silica have been established for over 12 years, and have an annual turnover of £13 million. With our unrivalled experience and expertise, we can now claim to meet our customers requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now, for our latest Free literature and begin to experience the "Silica Systems Service".

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Tel (Home): .... Tel (Work): ....

Company Name: ....

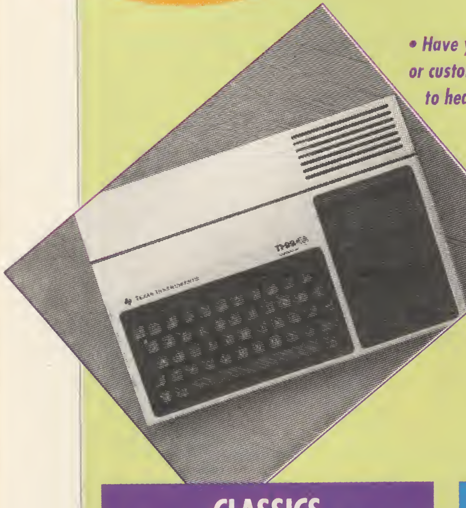
Which computer(s), if any, do you own? ....

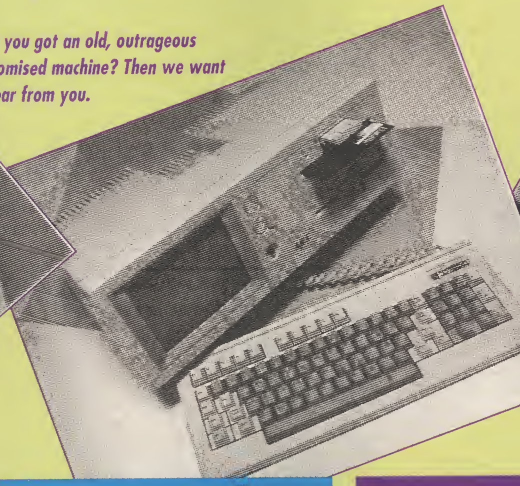
E&OE - Advertised prices and specifications may change - please return the coupon for the latest information.

OUTRAGEOUS COMPUTERS WANTED!

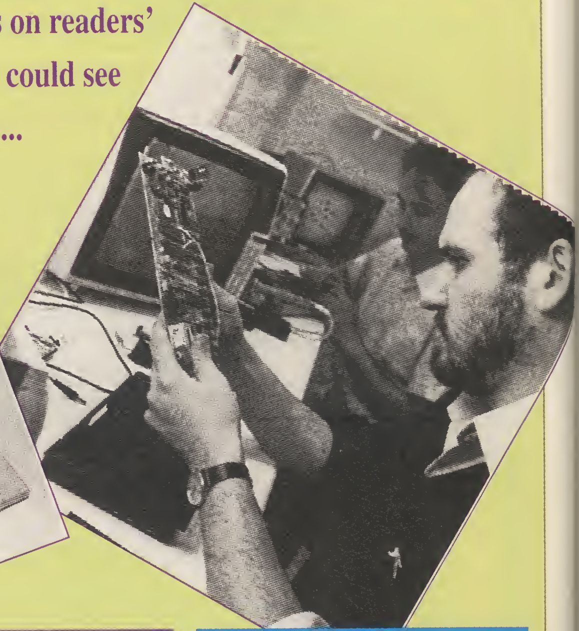
WIN £50

We will be running a series of features on readers' computers, so we need your help! You could see your machine in print and win a prize...





• *Have you got an old, outrageous or customised machine? Then we want to hear from you.*



CLASSICS

Orics, Enterprises, Video Genies, we love 'em. We are planning a major feature on some of computing's more elderly residents and we'd love to hear from anyone out there still using their pet PET or amazing Atom.

Send us a picture and details on what you are doing (or have done) with the machine and you could be in line for a prize.

BY THE WIRE

Every computer owner who knows how to use a screwdriver and a soldering iron seems to use them to attach all manner of gizmos to the back of their machine. We want to see your best efforts; what have you made a computer do with a couple of transistors and some Veroboard? A satellite link? Robot control? An oven timer? A prize awaits the best or most amusing.

CUSTOM KIT

You start with a simple 8-bit. You add more memory. You beef up the processor. Add another disk drive. And a new box. Now a hard disk. And a MIDI interface. A CD-ROM. A colour monitor. Before you know it your Spectrum's become a NeXT. How far has your machine gone? We want to see pictures and specifications of the most over-the-top customised machine in Britain.

ON THE CHEAP

Express readers love a bargain; you only have to see how many reader ads we get a week to work that out! But who has got the best deal? Did you pick up your PC for a ton? Or get an outrageous rate on an Amiga? We want to know about the best bargains you've ever seen (not just computers but peripherals and software too) for a feature on cut price computing.

WHAT'S THE USE?

Computers aren't just for playing games, there are hundreds of more serious uses you can put one to, and some off-the-wall ones as well. So if your CPC is doing the air traffic control for Heathrow or running the reactor at Sizewell A then drop us a line.

If your computer is a bit unusual, drop us a line with the details and a picture to: Outrageous Machines, New Computer Express, 30 Monmouth Street, Bath BA1 2BW. Include a stamped self-addressed envelope if you want your pictures back. The most amazing entry in the five categories we receive by February 14 will each win a brand new £50 note.

★ POCKET SIZED ★ PC-COMPATIBLE ★ PERSONAL ORGANISER ★

ATARI Portfolio

THE PC IN YOUR POCKET

The new Portfolio from Atari is the world's first pocket-sized electronic organiser that is also a powerful PC compatible computer, with a full QWERTY keyboard and scrolling 80×25 character display.

Portfolio includes everything you would expect from an electronic organiser - an address and telephone book, time manager, diary and sophisticated calculator.

Portfolio also includes several functions that you would not expect - a spreadsheet for your personal budget and expense records, as well as a text processor for typing memos and letters.

And, because Atari's Portfolio is PC compatible, it can communicate with your desktop PC at home, or in the office. You can transfer files from one to the other, to enable you to update your reports and figures with the Portfolio while you are on the move.

FOR ONLY £199 INC VAT

SPECIFICATION

- ★ ***Processor:*** Intel 80C88 at 4.9152Mhz.
- ★ ***Operating System:*** Compatible with MS-DOS 2.11.
- ★ ***Internal ROM:*** 256K containing BIOS, operating system and applications suite.
- ★ ***RAM:*** 128K with an internal RAM disk, configurable from 8K. Externally expandable to 640K RAM.
- ★ ***Keyboard:*** 63 keys, QWERTY, IBM PC BIOS compatible. Buried numeric pad and function keys. Optional key click.
- ★ ***Character Set:*** Extended IBM ASCII (255 characters).
- ★ ***Mass storage:*** credit card sized memory cards (32K or 64K or 128K RAM).
- ★ ***Display:*** Graphics LCD, supertwist technology, MDA compatible, 40 columns x 8 lines, 240 x 64 pixels (with the option to window a full 80 x 25 character display). Keyboard controlled contrast.
- ★ ***Peripherals:*** 60 pin expansion BUS to take serial and parallel ports and memory expansion units.
- ★ ***Size:*** 8" x 4" x 1" (200mm x 105mm x 29mm).
- ★ ***Weight:*** 495 grammes (with batteries).
- ★ ***Applications:*** calendar and diary, address and phone book, Lotus 1-2-3 compatible spreadsheet, text processor, communications software.

COMING SOON!

In addition to the excellent software built-in to the Portfolio Free of Charge (see right), other software and peripheral products, such as the sophisticated Pocket Finance package and serial/centronics interfaces are available. And it doesn't stop there. Many manufacturers have recognised the potential of the Portfolio and have already started to design new peripherals and software. Products currently under development include: Serial interface with built in mini modem, Apple Macintosh interface, business, utility and programming software plus a range of adventure and battle strategy games. For further free details on the Portfolio range, fill in the coupon below and return it to Silica Systems now.

5 BUILT-IN APPLICATIONS TO GET YOU ORGANISED!

To get you started, Portfolio comes with a suite of five useful functions built-in, all accessible from a simple menu display.

TIME MANAGER

More than just an electronic diary, the Portfolio Time Manager enables you to plan your appointments via a comprehensive calendar and diary. It can even be programmed to sound an audible alarm at specific times to remind you of important appointments.

CALCULATOR

Your Portfolio will be invaluable in the office or at home as a powerful pocket calculator. It has a full range of functions, including factorial, power and root calculations, all with multi display formats and memories.

ADDRESS BOOK & DIALLER

Portfolio has a complete address book facility that allows you to store hundreds of addresses and phone numbers. And, at the touch of a button, you can retrieve any one of them, or search for a specific grouping, such as "all Italian restaurants". And, when you are ready to book your table, hold your Portfolio to your telephone mouthpiece and use its special built-in tone dialler to dial the number for you.

TEXT PROCESSOR

The Portfolio's built-in text processor program includes word wrap, line and column count, string search, in fact most of the functions you would find in a word processor. It handles printer and word processor control codes and allows easy transfer of files between Portfolio and your desktop PC.

SPREADSHEET

For real calculating power, Portfolio has a Lotus 1-2-3 compatible spreadsheet built-in. It has 127 columns x 225 rows and reads/writes Lotus V1.0 and V2.01 files, so you can transfer data to and from Lotus 1-2-3 on your desktop PC. The Portfolio's 256K ROM includes MS-DOS and PC BIOS compatible systems software.

MEMORY CARDS

Portfolio can store and retrieve data and programs from its own RAM, or from small credit card size memory cards, that slot into its built-in card drive. The cards are available in three sizes, 32K, 64K and 128K, so you can carry a library of data in your pocket. The card drive also accepts ROM cards, which can contain commercial or custom software.

POWER SUPPLY

Portfolio is powered by three AA batteries which will run for up to six weeks with normal use, or from the mains using an adaptor. All the peripherals take their power from the Portfolio, so no extra batteries or adaptors are required. A 'battery-low' warning and memory back-up ensure that information is not lost when the batteries are changed.

INTERFACES & PERIPHERALS

Portfolio can communicate with other computers and supports a growing range of peripherals via a built-in 60 pin bus connector. Peripherals available include serial and parallel interfaces and memory expanders (to 640K). You can also add a card drive to your desktop PC, to enable it to read/write to Portfolio's cards.

SILICA SYSTEMS OFFER YOU

FREE OVERNIGHT COURIER DELIVERY: On all hardware orders shipped in the UK.
TECHNICAL SUPPORT HELPLINE: Team of Atari technical experts at your service.
PRICE MATCH: We normally match competitors on a "Same product - Same price" basis.
ESTABLISHED 12 YEARS: Proven track record in professional computer sales.
£13M TURNOVER (with 60 staff): Solid and reliable with maintained growth.
BUSINESS/EDUCATION/GOVERNMENT: Volume discounts available for large orders.
SHOWROOMS: Demonstration and training facilities at our London & Sidcup branches.
THE FULL STOCK RANGE: All of your Atari PC requirements from one supplier.
FREE CATALOGUES: Will be mailed to you with offers and software/peripheral details.
PAYMENT: By cash, cheque and all major credit cards.
CREDIT PAYMENT TERMS: Silica are licensed credit brokers - details on request.

Before you decide when to buy your new Atari Portfolio, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after buying your Portfolio, when you may require additional peripherals or software, or help and advice with your new purchase. And, will the company you buy from contact you with details of new Portfolio products? At Silica Systems, we ensure that you will have nothing to worry about. Silica Systems is a new division of Silica Shop, the UK's leading Atari specialists. This new division has been established to provide a service to the more serious home user, as well as to business and education purchasers. Silica have been established for over 12 years, and have an annual turnover of £13 million. With our unrivalled experience and expertise, we can now claim to meet our customers requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now, for our latest Free literature and begin to experience the "Silica Systems Service".

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Special compacting techniques enable up to 3 programs to fit on one disk. Now saves directly to disk as Amiga Dos - reloads independently of the cartridge - even transfer to hard drive! Works with up to 2 Megs of Ram - even 1 Meg Chip Mem (Fatter Agnus).

- **UNIQUE INFINITE LIFE/TRAINER MODE - NOW MORE POWERFUL**

Allows you to generate more and even infinite lives, fuel, ammo, etc. Perfect as a trainer mode to get you past that "impossible" level. Very easy to use.

- **IMPROVED SPRITE EDITOR**

The full Sprite Editor allows you to view/modify the whole sprite set including any "attached" sprites. RANGE OF IMPROVED FEATURES.

- **VIRUS DETECTION**

Comprehensive virus detection and removal features to protect your software investment. Works with all presently known viruses.

- **SAVE PICTURES AND MUSIC TO DISK**

Pictures and sound samples can be saved to disk. Files are saved directly IFF format suitable for use with all the major graphic and music packages. Samples are displayed as screen waveform.

- **SLOW MOTION MODE**

Now you can slow down the action to your own pace. Easily adjustable from full speed to 20% speed. Ideal to help you through the tricky parts!

- **RESTART THE PROGRAM**

Simply press a key and the program will continue where you left off.

- **FULL STATUS REPORTING**

At the press of a key now you can view the Machine Status, including Fast Ram, Chip Ram, RamDisk, Drive Status, etc.

- **POWERFUL PICTURE EDITOR**

Now you can manipulate and search for screens throughout memory. Over 50 commands to edit the picture plus unique on screen status "overlay" shows all the information you could ever need to work on screens. No other product comes close to offering such dynamic screen handling of frozen programs!!

- **MUSIC SOUND TRACKER**

With Sound Tracker you can find the complete music in programs, demos,etc. and save them to disk. Saves in format suitable for most track player programs. Works with loads of programs!!

- **AUTOFIRE MANAGER**

From the Action Replay II preference screen you can now set up autofire from 0 to 100%. Just imagine continuous fire power? Joystick 1 and 2 are set separately for that extra advantage!

- **DISKCODER**

With the new "Diskcoder" option you can now 'tag' your disks with a unique code that will prevent the disk from being loaded by anyone else. 'Tagged" disks will only reload when you enter the code. Very useful for security.

- **PREFERENCES**

Action Replay II now has screen colour preferences with menu setup. Customise your screens to suit your taste. Very simple to use.

- **DISK MONITOR**

Invaluable disk monitor - displays disk information in easy to understand format. Full modify/save options.

- **DOS COMMANDS**

Now you have a selection of DOS commands available at all times - DIR, FORMAT, COPY, DEVICE, etc.

- **DISK COPY**

Disk Copy at the press of a button - faster than Dos Copy. No need to load Workbench - available at all times.

- **BOOT SELECTOR**

Either DF0 or DF1 can be selected as the boot drive when working with Amiga Dos disks. Very useful to be able to boot from your external drive.

PLUS A MACHINE CODE FREEZER MONITOR WITH EVEN MORE POWER!!

EVEN MORE FEATURES INCLUDING 80 COLUMN DISPLAY AND 2 WAY SCROLLING:-

● Full M68000 Assembler/Disassembler ● Full screen editor ● Load/Save block ● Write String to memory ● Jump to specific address ● Show Ram as text ● Show frozen picture ● Play resident sample ● Show and edit all CPU registers and flag ● Calculator ● Help command ● Full search feature ● Unique Custon Chip Editor allows you to see and modify all chip registers - even write only registers ● Notepad ● Disk handling - show actual track, Disk Sync. pattern etc. ● Dynamic Breakpoint handling ● Show memory as HEX, ASCII, Assembler, Decimal ● Copper Assemble/Disassemble - now with suffix names

REMEMBER AT ALL TIMES YOU ARE INTERROGATING THE PROGRAM IN IT'S "FROZEN" STATE
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